ENGINEERING AND MINING JOURNAL

A McGRAW-HILL PUBLICATION

NOVEMBER 1953

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FOUNDED 1866

Pro and Con on Tariffs
By Two Industry Observers
p. 78

Deep Ruth Mine Solves
Tough Shaft Water Problem
p. 94

New Streamlined Plant Smelts
Aluminum, Brass, Zinc, Lead . . . p.72

an A-S-H pump to fit

your abrasive pulp handling need

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A little sealing water goes a long way in Hydroseals toward cutting your costs in power and in maintenance. You save ⅓ to ½ in power. And, million-ton-plus pumping records are common.

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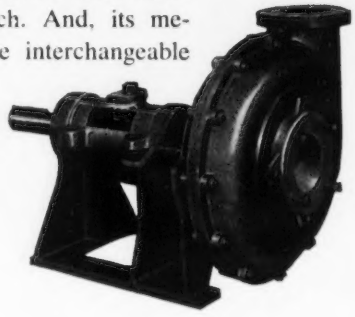

See the **CENTRISEAL** at the **Chemical Show**
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Of the A-S-H pumps sold last year, 73% were specified by engineers who already had our pumps in service. When you see what Hydroseals or Centriseals will do for you, you'll be sending repeat orders, too.

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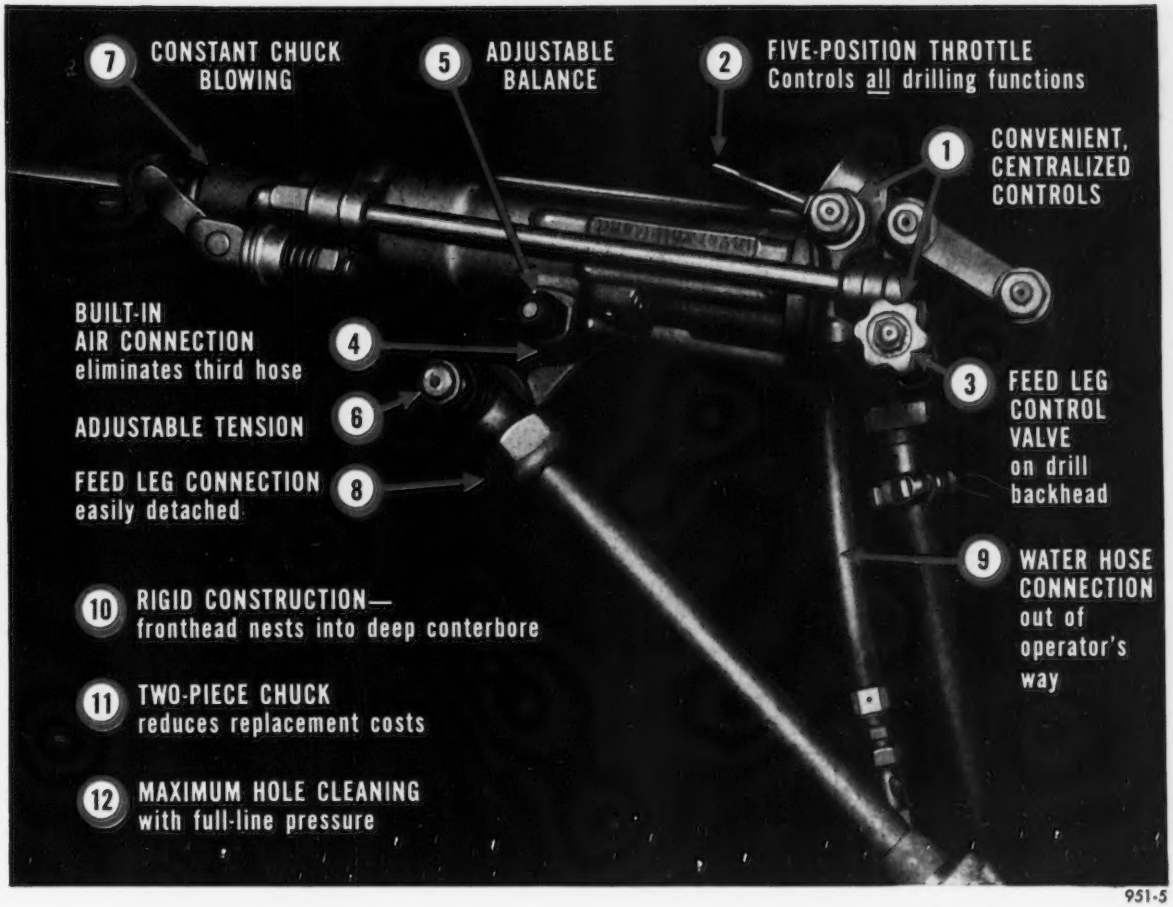
that add up to
MORE TONNAGE PER SHIFT!


7 CONSTANT CHUCK BLOWING
5 ADJUSTABLE BALANCE
2 FIVE-POSITION THROTTLE Controls all drilling functions
1 CONVENIENT, CENTRALIZED CONTROLS
BUILT-IN AIR CONNECTION eliminates third hose
4
ADJUSTABLE TENSION
6
FEED LEG CONNECTION easily detached
8
3 FEED LEG CONTROL VALVE on drill backhead
9 WATER HOSE CONNECTION out of operator's way
10 RIGID CONSTRUCTION— fronthead nests into deep conterbore
11 TWO-PIECE CHUCK reduces replacement costs
12 MAXIMUM HOLE CLEANING with full-line pressure

951-5

The advantages of a Jackleg type of drill are now so well established that you should buy the best available design for the job. Collectively the Ingersoll-Rand JR-38 Jackdrill design features make it the fastest drilling, easiest handling one-man drifter unit ever developed.

The JR-38 is not a Jackhamer-Jackleg combination but a completely integrated Jackleg Drill—designed to take full advantage of faster, easier-drilling Carset Jackbits. Use it as a drifter—as a stoper—as a Jackhamer. Its flexibility, ease of handling and simplicity of control pleases owners and operators alike.

Ask your Ingersoll-Rand representative for complete information on the new JR-38. Or write for your copy of Bulletin 4144.

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ENGINEERING AND MINING JOURNAL

87th YEAR OF PUBLICATION
VOLUME 154 NUMBER 11

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NOVEMBER, 1953

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LETTERS TO THE EDITOR

Politics And Mining

SIR:

Your editorial entitled "The Bureau and Politics" (*E&MJ*, Aug. and Sept.) states well my feelings and thoughts, and those of many I know, on what the relationship should be between the Bureau and its head and the political officials in charge of government. Could industry and the professional trade journals campaign for the organization of the Bureau of Mines so that it, and its head (could) assume a stature comparable to . . . the Bureau of Standards or USGS? There is a tremendous opportunity for real contribution to the industry and the nation (by such an agency).

PHILIP B. BUCKY,
Professor of Mining,
Columbia University.

Mr. Wormser On Civil Service

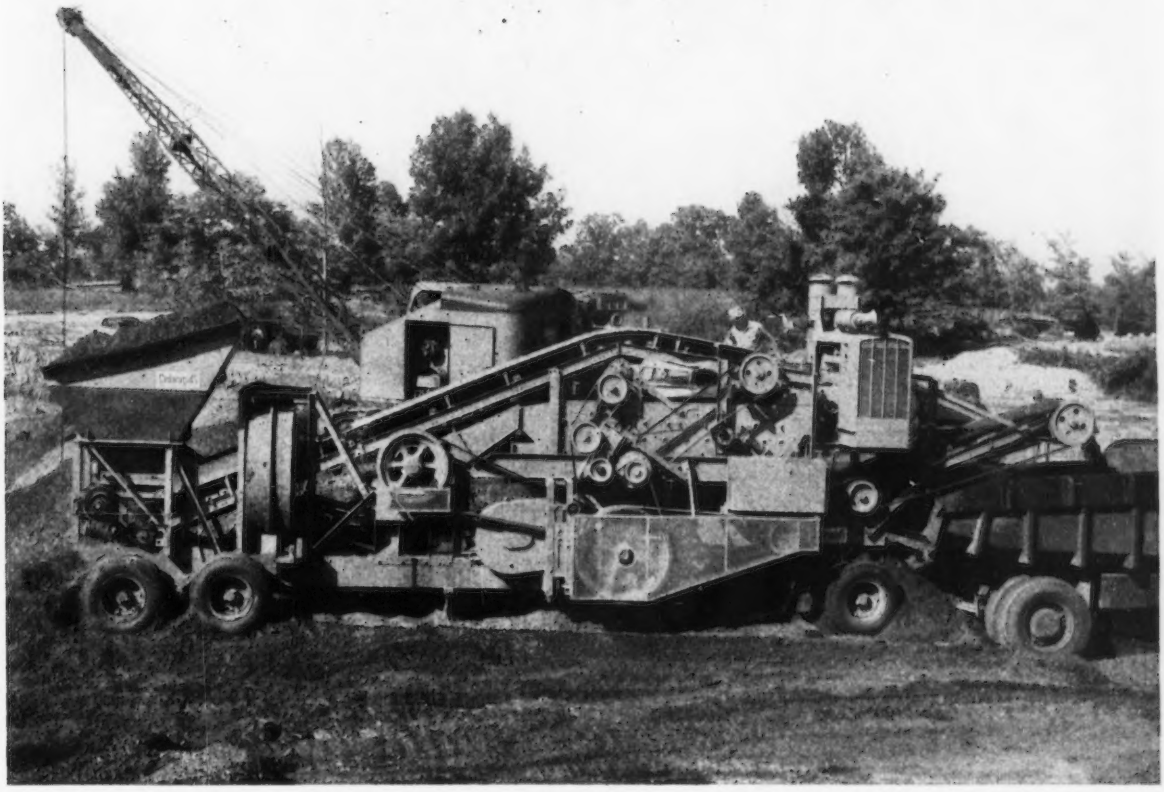
SIR:

With regard to the decision which placed certain key jobs within the Bureau of Mines outside the competitive Civil Service, the action taken was entirely consistent with clearly stated policies of the Administration. (*E&MJ* editorial, Sept., 1953).

Your statement to the effect that there is no present intention to displace the affected officials of the Bureau is entirely correct. Furthermore, we feel that there is every reason to expect that future openings in these top positions as a normal course will be filled from within the ranks of the agency. At the same time, some flexibility is needed if we are to take advantage of opportunities to obtain the services of more qualified persons without Civil Service status. No one can argue that the jobs involved are not of the key variety and our objective is wholly one of providing the best service possible through the Bureau of Mines by placing top flight personnel in these positions.

(*Continued on page 202*)

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Grommet belts last 3 times longer in 90 day use-and-abuse test

B. F. Goodrich V belts last longer, yet cost no more

BIG portable crushing plants like this are built to take the jolting, jarring action of rock crushing. But the shock to V belts is terrific. In this case, the belts used to drive the crusher weren't lasting much more than 30 days. A B. F. Goodrich man heard about the frequent replacements, and asked to install a test set of Grommet V belts. Instead of being ready for the junkpile after 30 days, the Grommet belts were still going strong after 90 days of rugged use and abuse.

Strongest V belt made

No wonder B. F. Goodrich Grommet belts outlast and outperform ordinary belts. In Grommet belts, all the load-carrying cords are concentrated in twin grommets. A grommet is like a giant twisted cable except that it's endless. Since there are no center cords, the Grommet belt is more flexible, and so can "give" temporarily and absorb shock loads. And there's no overlapping cord *section* as in all ordinary belts—no weak spots to cause premature belt failure.

⅓ more gripping power

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're free to flex and grip sheaves better. Size for size, Grommet belts give ⅓ more gripping power with less slip, pull heavier loads with a higher safety factor.

Send for proof today

Send the coupon for a set of reports showing actual installations where Grommet V belts have outlasted all others. See how you, too, can make important savings in belting, production and maintenance costs with these stronger, longer-lasting V belts.

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The B. F. Goodrich Company
Dept. M-100, Akron 18, Ohio

☐ Send set of installation reports on B. F. Goodrich Grommet belts.
☐ Have a BFG distributor call on me.

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B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

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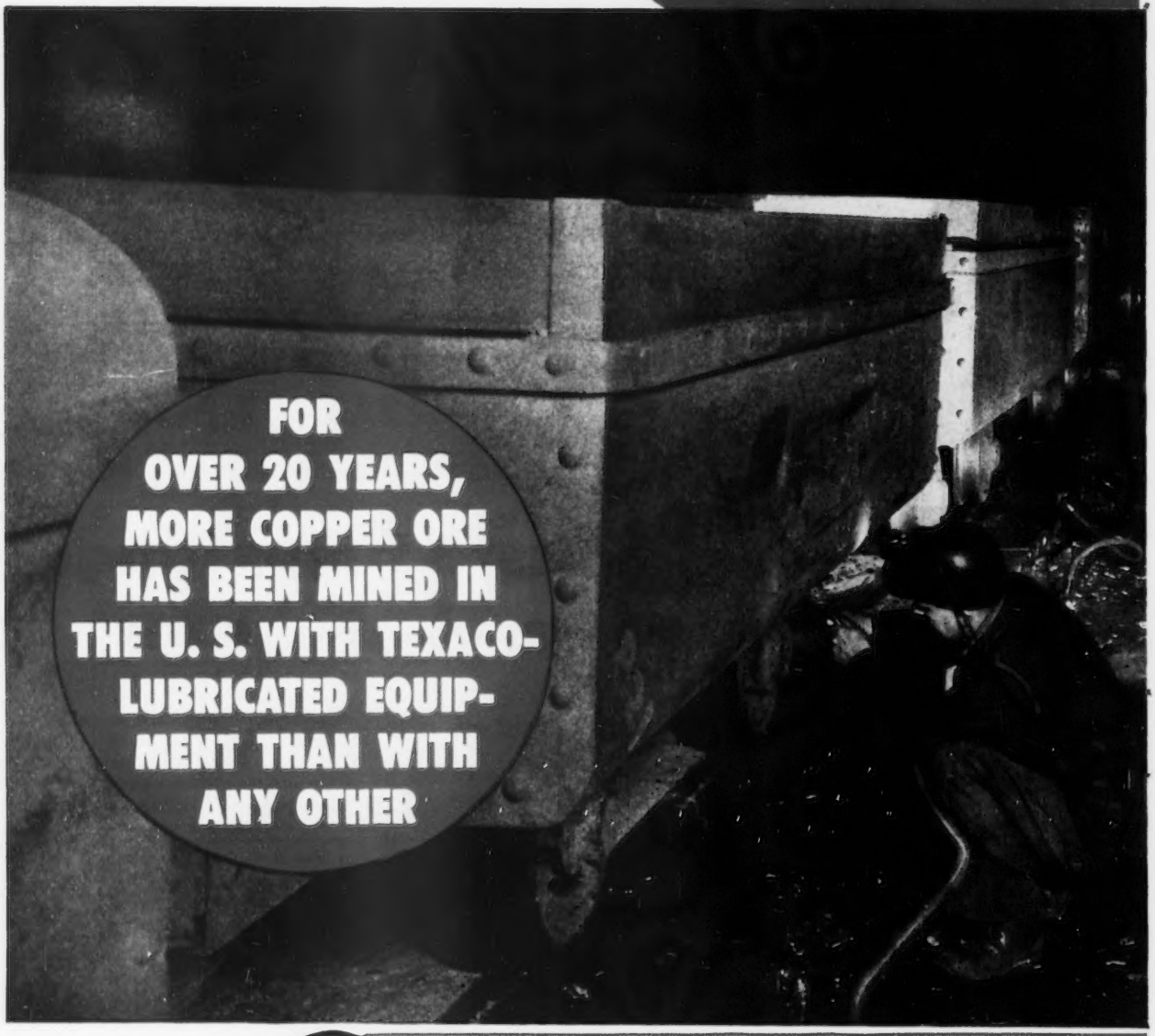

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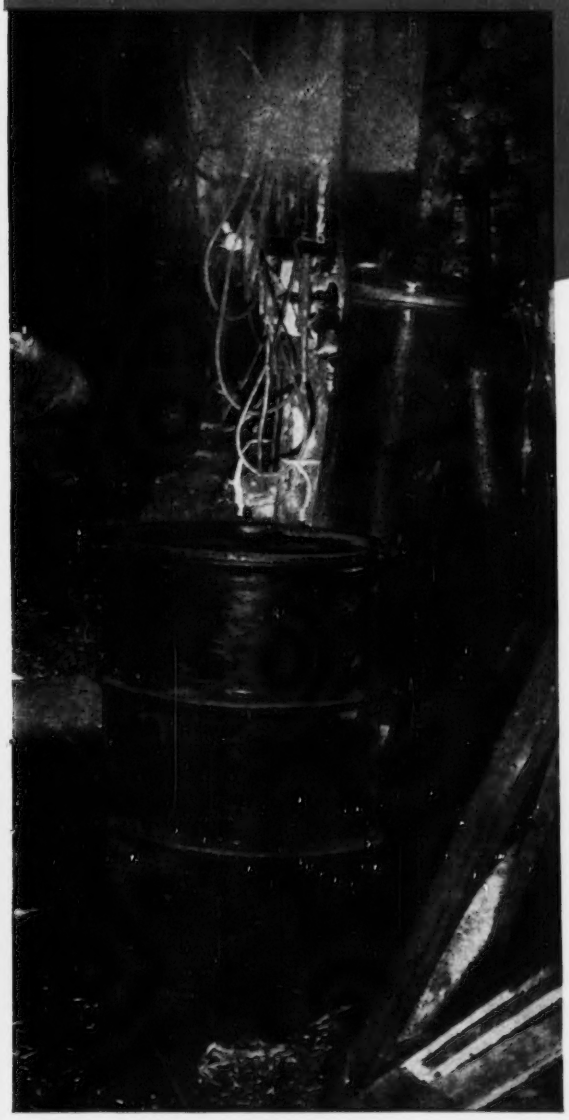
EASIER STARTS . . . TEXACO OLYMPIAN GREASE



COLD WEATHER doesn't worry operators who use *Texaco Olympian Grease* in their mine car wheels. It's the lubricant especially made to work as well in winter as it does in summer — no seasonal change required. That means easier starts and smoother rolling the year 'round . . . longer trains . . . more tonnage moved.

Texaco Olympian Grease cuts maintenance costs, too. It stays in the bearings, seals out dirt and moisture . . . affording longer lasting protection. It resists oxidation, leakage and separation in service or in storage. *Texaco Olympian Grease* is made in three consistencies, meets every requirement.

On wire rope and open gears, use *Texaco Crater*. It keeps your rope strong longer, assures longer life for your gears. In many mines, *Texaco Crater X Fluid* is preferred for more convenient application. It *goes* on as a liquid, *stays* on as a tough, protective lubricating film.

Let a Texaco Lubrication Engineer help you simplify and improve your lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

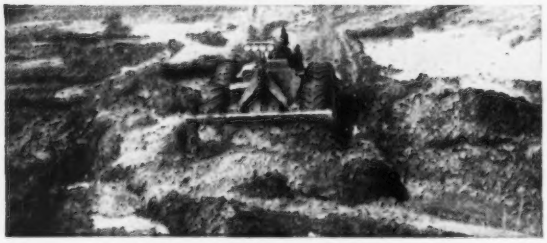
Lubricants and Fuels
FOR THE MINING INDUSTRY

Pictures of the month... *by LeTourneau-Westinghouse...*

HAULS 50 TONS PER LOAD — Diamond T Stripping Company of Philipsburg, Pa, moves 7000 yds of overburden per 16-hour day with 2 Model "A" Tournarockers. These giant Rear-Dumps haul 50 tons of the blasted rock per trip. They are loaded by a 6-yd Lima shovel. Operators control Tournarockers easily . . . just push an electric switch to steer or dump . . . flick a small lever to change gears. No wrestling bulky levers . . . no clutching needed. Photos show stripping from a Class D seam of coal.

STRIPS 66 PAY YDS PER HR — Georgia Lime Rock Company works this D Tournapull 12 months a year to strip 3 to 30 ft of low-grade Fuller's earth. Because of its speed, one-man "D" alone uncovers enough lime rock to keep the plant busy. In typical operation, "D" loads 5½ bank yds in 25 seconds. Output averages 66 to 71 bank yds hourly over 1800 ft cycles.

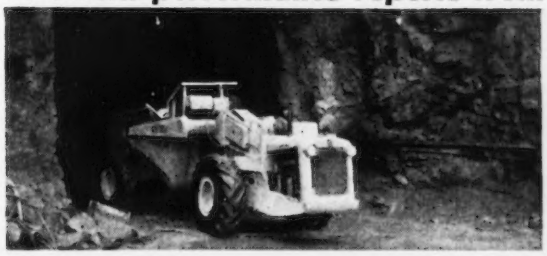
99% EFFICIENT — $56.80! That's all Bill Ward has spent for repairs on his 2 Tournatractors — one 2 years old; the other, 3 months! Used mainly on mine-maintenance-type jobs, both units have been 99% mechanically efficient. They drive everywhere without planking. Main assignments: pulling 45-ton trailer, maintaining access roads, leveling dumps, grading parking areas, stockpiling coal.



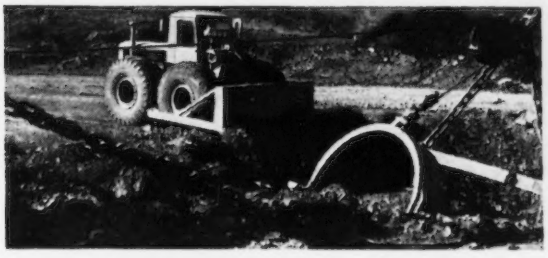
CLEARS FLOODED GRAVEL PIT — Big low-pressure tires give Gil Wyner's Tournatractor ample flotation for clearing muck from this rain-flooded gravel pit near Gloucester, Massachusetts. Unit also handles shovel clean-up, miscellaneous odd jobs. Travel between assignments is made under own power . . . Tournatractor drives everywhere at speeds up to 19 mph.

(*Advertisement*)

. . . with performance reports from around the world



4 MILES FROM ARCTIC CIRCLE — At Jumisko, Finland, 6 Tournarockers are hauling 400,000 yds of granite to excavate 4 miles of tunnels for water power. Winter temperatures drop to 40° below, but units operate 24 hours a day. With 13 ft 9 in. turn radius, they maneuver easily in the 20 ft tunnels.



WORKS IN ABRASIVE MATERIAL — Westmoreland Manganese Corp, Batesville, Arkansas, works their Tournatractor in material so abrasive that dragline teeth must be replaced every 8 hrs. This set of tires, retreaded once, still has 45% of tread left after over 1000 hrs of use. Unit cleans clay and flint rock from around 2½-yd shovel and 5-yd dragline.

ECONOMICAL ON 700 FT PUSH — Replacing 2 crawler-tractors for Marietta Concrete Corp, Ohio, Tournatractor pushes sand and gravel 50 to 700 ft to dragline for loading. Because this unit dozes at 3½ to 8 mph, it equals output of both big crawlers which could work no faster than 1 to 2 mph.

TIRES OUTLAST TRACKS, 4 TO 1 — Because tracks on their crawler had to be replaced every 650 to 900 hrs, Miami Crushed Stone Co, Florida, bought this Tournatractor for stockpiling, other odd jobs. In 9 months, Tournatractor worked 3800 hrs — still had original tires. In 12 months, their crawler worked only 2600 hrs. Crawler lost hours for track repair; was often idle because it could not economically handle scattered jobs. Frequently, Tournatractor could get to job, do work, and return before crawler could travel ¼ mi. Tournatractor also boosted production . . . pushing sand 150 ft, it delivered 2 loads to crawler's 1. For more information on Tournatractor or other tools, write LeTourneau-Westinghouse Company, Peoria, Ill.

Tournapull, Tournarocker—Trademark Reg. U.S. Pat. Off. Tournatractor—Trademark Pic-524 M

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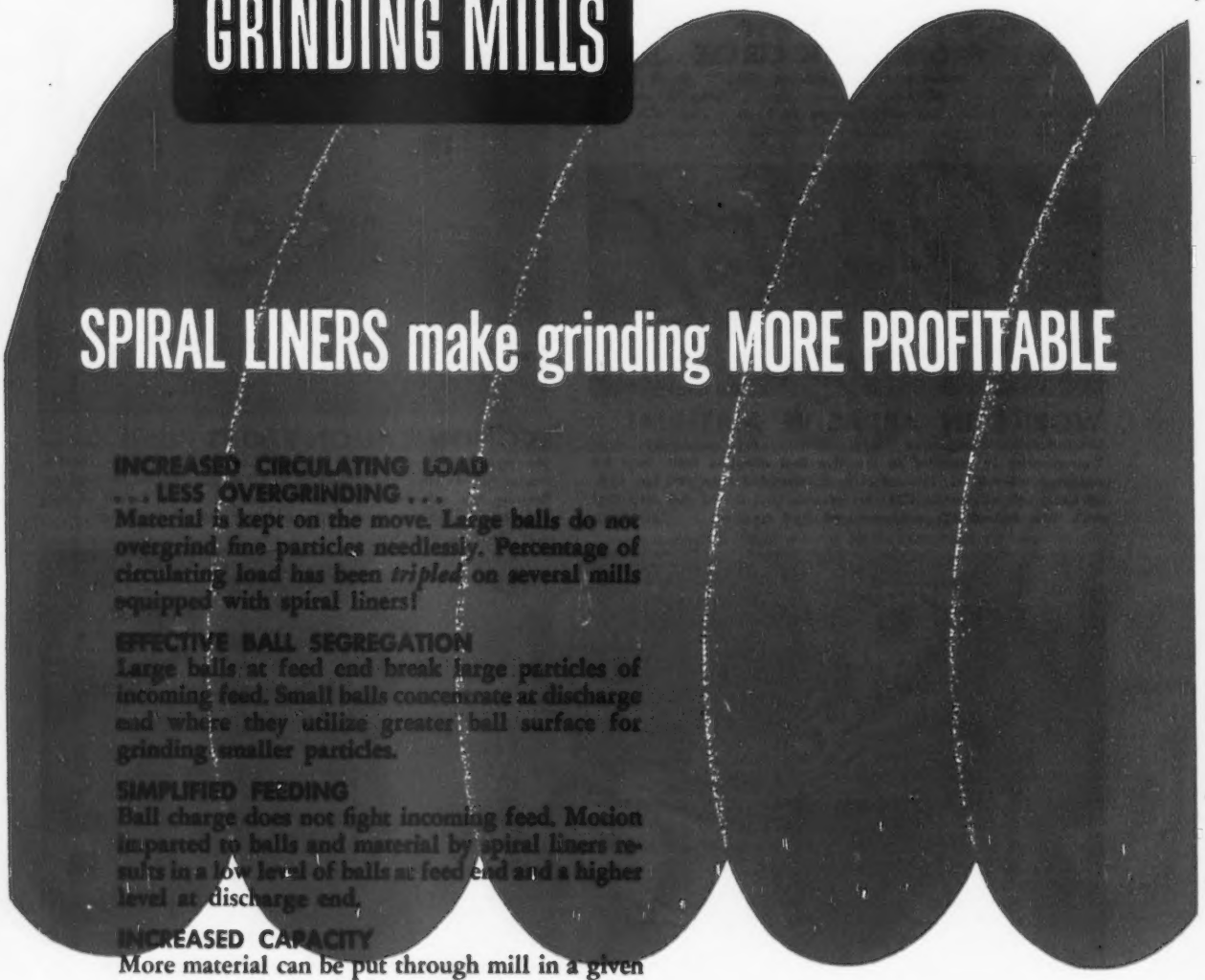
ALLIS-CHALMERS

GRINDING MILLS



SPIRAL LINERS make grinding MORE PROFITABLE

INCREASED CIRCULATING LOAD . . . LESS OVERGRINDING . . .
Material is kept on the move. Large balls do not overgrind fine particles needlessly. Percentage of circulating load has been *tripled* on several mills equipped with spiral liners!

EFFECTIVE BALL SEGREGATION
Large balls at feed end break large particles of incoming feed. Small balls concentrate at discharge end where they utilize greater ball surface for grinding smaller particles.

SIMPLIFIED FEEDING
Ball charge does not fight incoming feed. Motion imparted to balls and material by spiral liners results in a low level of balls at feed end and a higher level at discharge end.

INCREASED CAPACITY
More material can be put through mill in a given time. Retention time of material in the mill is reduced. Power cost is less — no power is wasted on overgrinding . . . ball segregation increases efficiency.

For application of spiral liners to your grinding mill, call the Allis-Chalmers representative in your area, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4155

ALLIS-

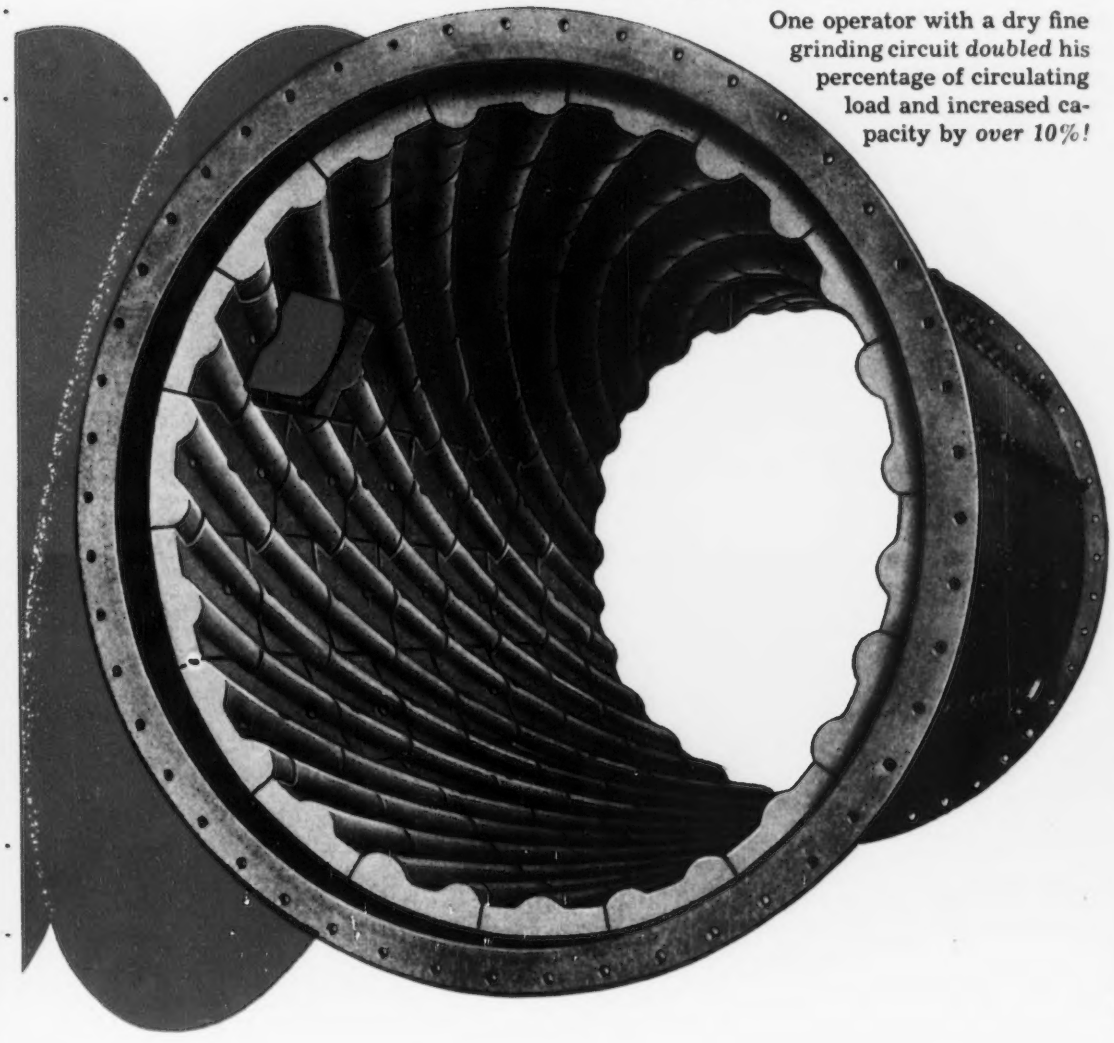
MILWAUKEE 1,

HERE ARE USER EXPERIENCES . . .

One operator with mills in a coarse wet grinding circuit *tripled* his percentage of circulating load with spiral liners.

Another wet grinding mill operator *tripled* circulating load and increased capacity by nearly 10%! Plans at this plant call for spiral liners for all ball mills.

One operator with a dry fine grinding circuit *doubled* his percentage of circulating load and increased capacity by *over 10%!*



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Naturally you want

TRUE CORES

. . . and you want them **FAST**

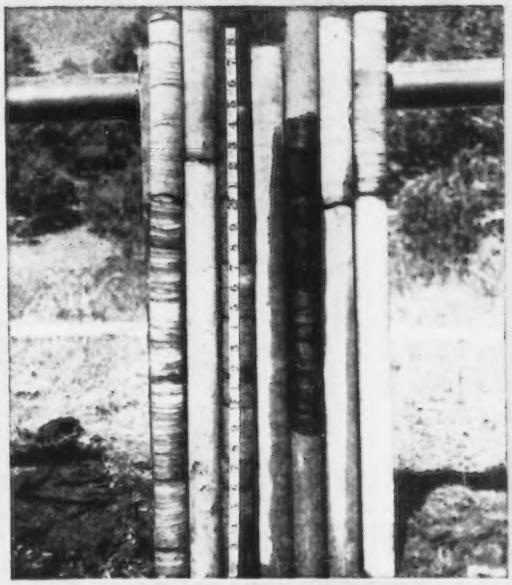
and at **LOWEST COST**

SO . . . **WHY NOT BET ON A SURE THING . . .**

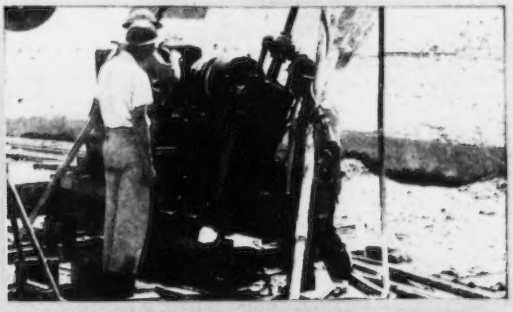
On the strength of the story told by these cores, a new mine was opened and became a big producer. With a Joy Diamond Core Drill, it was a simple matter to analyze and measure these cores and determine, precisely, the mineral content, size and value of the deposit.

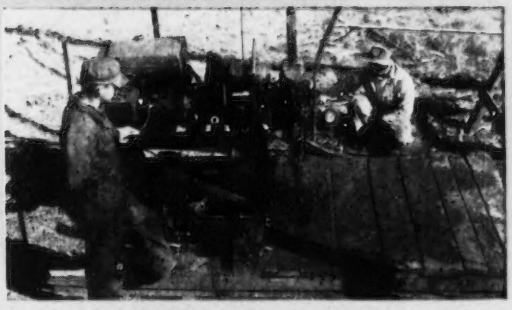
Prospecting can be done at a fraction of the cost and in much less time than any other method. There are many other uses for Joy Diamond Core Drills, too. They're great for blocking out ore bodies, testing sub-surface foundations and completed structures, and drilling holes for pressure grouting, underground drainage, ventilation and gas relief.

For full details on Joy Diamond Core Drills, write for bulletins to **Joy Manufacturing Company, Oliver building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



USE JOY DIAMOND CORE DRILLING EQUIPMENT





THE JOY 22-HD is a heavy-duty drill that's rugged, portable and versatile. It's direct-driven with four-speed transmission—either hydraulic or screw-feed swivelhead. An easily-operated, rugged, but sensitive hoist that handles strings of drill pipe up to 2000 feet and operates at hoisting speeds up to 290 feet per minute. Details in Bulletin D-28.

THE JOY 12-B is a highly efficient drill that can be quickly dismantled into four compact units for convenient transportation. With a capacity of 1000 feet, its versatility and portability make it ideal for the other duties required of a sturdy drill. Available on skid or column mounting for surface or underground operation. Skid mounted model uses either hydraulic or screw-feed swivelhead. Details in Bulletin D-21.

CORE DRILLING BY CONTRACT

Complete core drill contracting service by highly skilled crews is available for mineral prospecting, blocking out ore bodies, testing foundations, drilling grout holes, etc. Write for full details.

TRUCO AND JOY-TRUCO DIAMOND BITS AND REAMER SHELLS

Sales and Resetting Service throughout the World by Joy Manufacturing Company

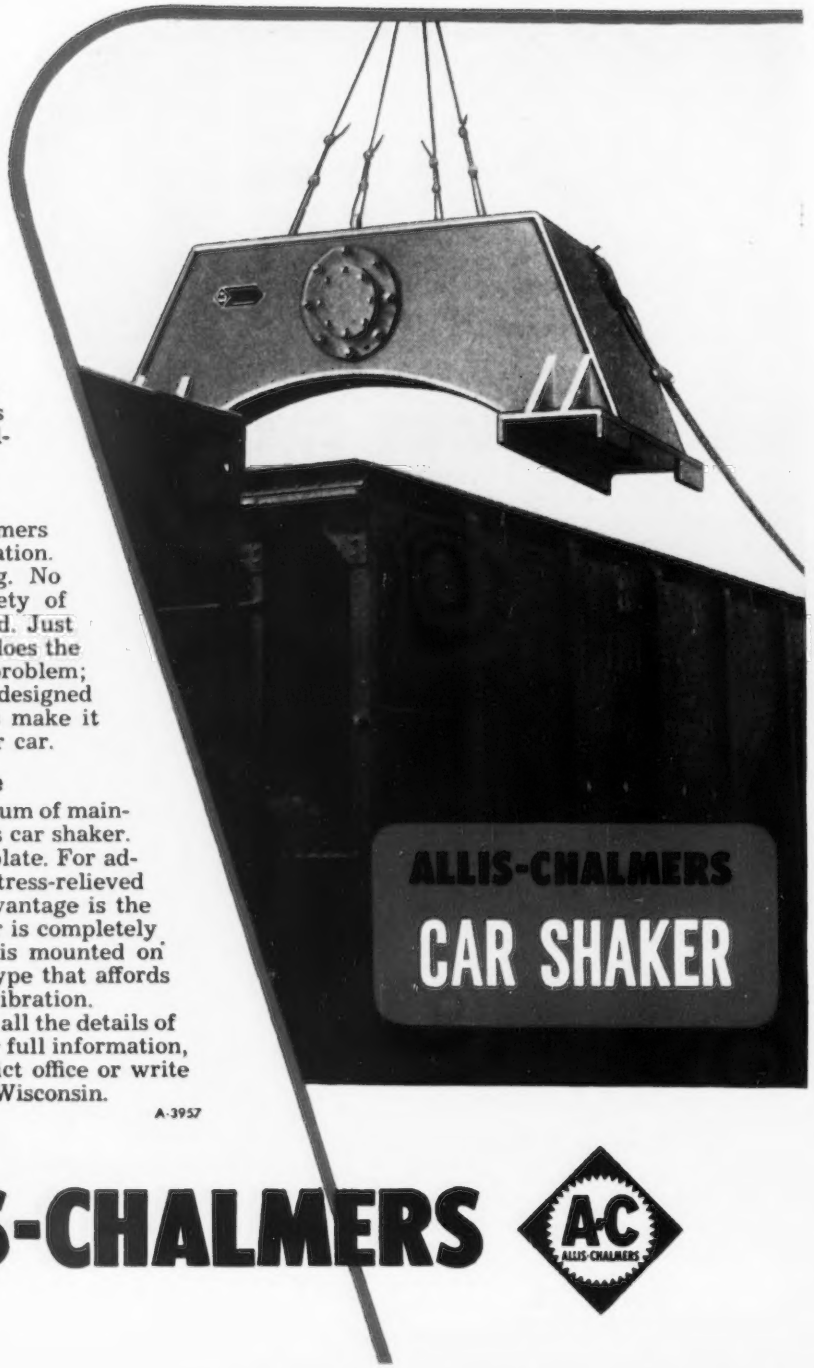
Consult a Joy Engineer

JOY

WSD M46

WORLD'S LARGEST BUILDER OF CORE DRILLS, ROTARY BLAST HOLE DRILLS AND MOTORIZED DRILL RIGS

CUT UNLOADING COSTS



You can save time and money using Allis-Chalmers car shakers for unloading cars. Here are two examples: **(1)** You can unload cars of wet sand or like materials in 1½ to 2¼ minutes; **(2)** you can unload coal in 1 to 6 minutes, depending on surface moisture.

In fact, you can unload any material in minutes, even if it is damp, compacted or in a partially frozen condition.

One-Man Operation

Best of all, using an Allis-Chalmers car shaker is a one-man operation. No more pounding or digging. No more worrying about the safety of men inside cars being unloaded. Just press a button; the car shaker does the rest. There is no positioning problem; Allis-Chalmers car shakers are designed to hang level, and wide shoes make it easy to engage any size hopper car.

Low Maintenance

You'll get long life and a minimum of maintenance with an Allis-Chalmers car shaker. Sides and top are heavy steel plate. For additional strength, the body is stress-relieved after welding. Another big advantage is the power arrangement. The motor is completely enclosed in the body. And it is mounted on rubber shear mountings of a type that affords maximum protection against vibration.

It will pay you to investigate all the details of Allis-Chalmers car shakers. For full information, consult your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3957

ALLIS-CHALMERS

HALLOYSITE

is the name!

HERE is the pit of the Dragon Consolidated Mine of the International Smelting and Refining Co. at Silver City, Utah. Here three of the four Northwests of Wells Cargo Inc., of Reno, Nevada, are loading out a fine clay called Halloysite.

This rare material of the Kaolin family is used in making paper, treating rubber and in other industries as a filter, in pottery or as a refractory.

This is another of the many types of mining work that Northwests are doing across the country. Northwest speed is outproducing larger, slower equipment. Northwest simplicity and dependability eliminates constant irritation and lost time caused by minor adjustments. Northwest steering smooths out the travel problems always present in stripping and assures easier, faster relocation on floors and benches.

Easy convertibility from Shovel to Crane or Dragline gives you the versatility that adapts a machine to the problems of *either* pit or plant. Now is the time to consider a Northwest. Let a Northwest Man tell you more about the many other Northwest advantages.

NORTHWEST ENGINEERING COMPANY
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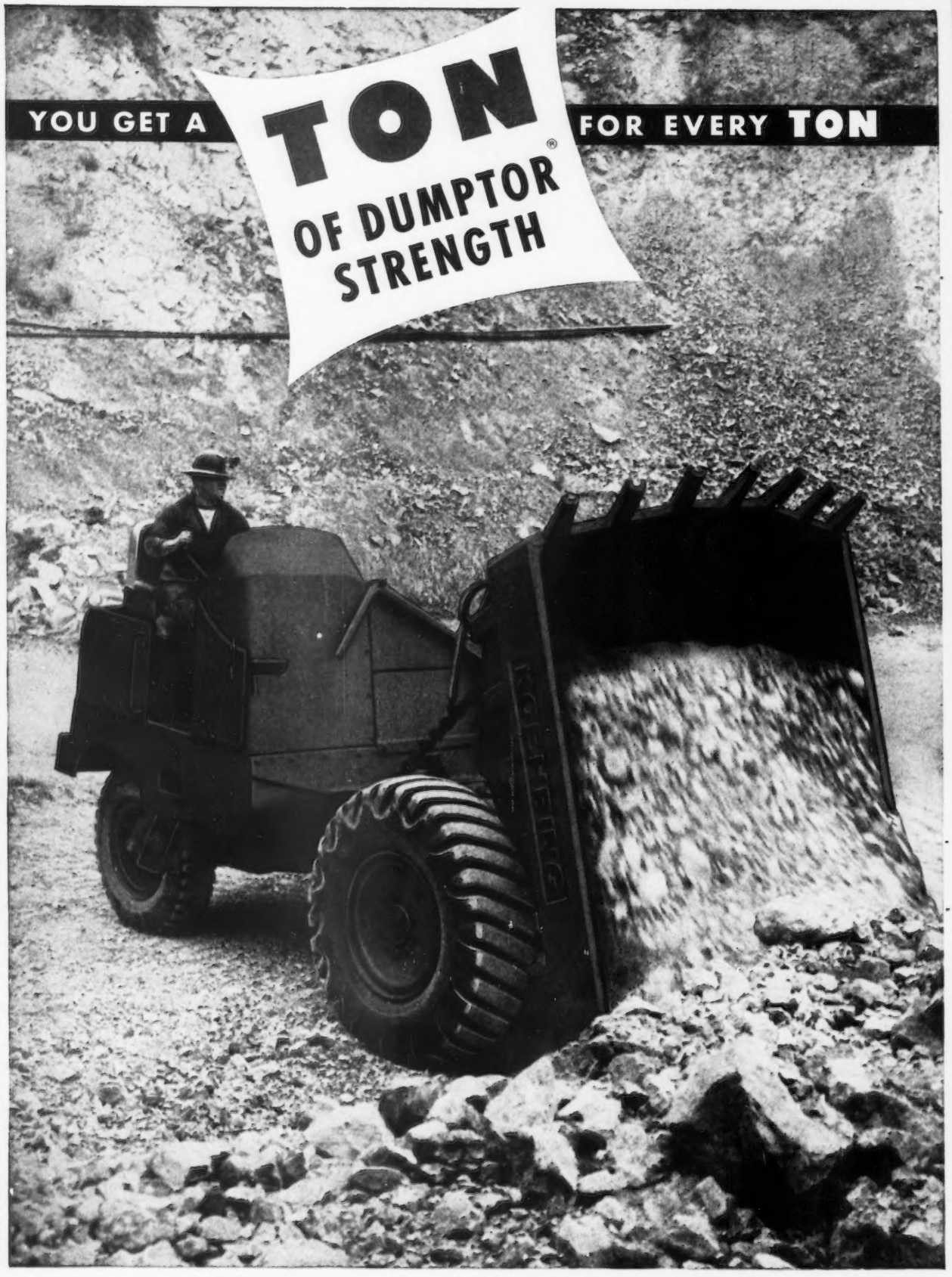
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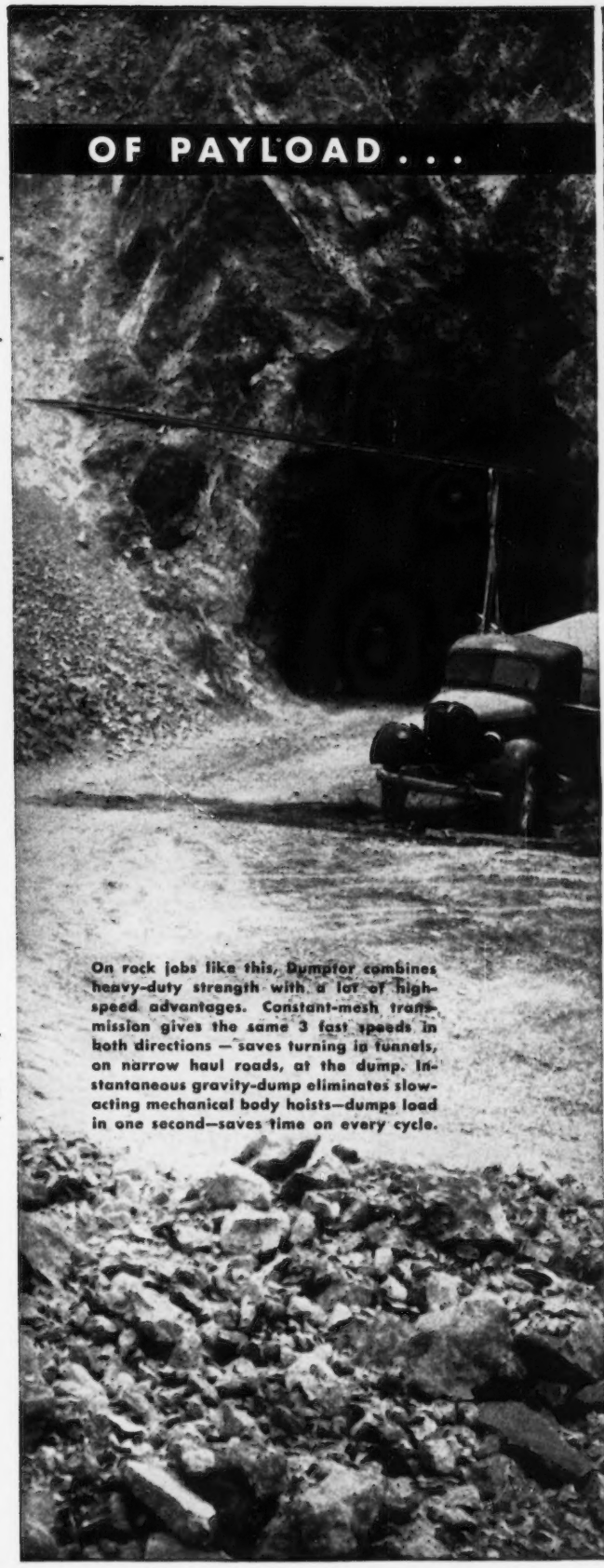
FOR EVERY TON



On rock jobs like this, Dumptor combines heavy-duty strength with a lot of high-speed advantages. Constant-mesh transmission gives the same 3 fast speeds in both directions — saves turning in tunnels, on narrow haul roads, at the dump. Instantaneous gravity-dump eliminates slow-acting mechanical body hoists—dumps load in one second—saves time on every cycle.

When you're loading ½ to 2½ yards of rock at a pass, your hauling units need plenty of strength to last. With Koehring heavy-duty Dumptor, there's more than a ton of net vehicle weight for every ton of payload capacity. Sides, ends and bottom of all-welded body are heavily-reinforced with 5 and 8" channel ribs. Double-strength multiple rib-reinforced bottom cushions shocks of rock loading. Stationary or free-swinging kick-out pan adds another ½" steel plate to Dumptor bottom for extra protection.

There's plenty of strength, too, in the Dumptor chassis to take the constant pounding of heavy loading and rough off-road hauling. Rigidly-trussed 8" ship channels make up the main frame. 4" heat treated alloy steel drive axles are protected by one-piece cast-steel housing. "I"-beam steering axle is cast alloy steel. There are no leaf springs — just one big, double-coil chassis spring on the steering axle — none on drive axle. Big drive tires eliminate the need for more springs — absorb loading and hauling shocks, save spring maintenance.

Even with all this heavy-duty construction, Koehring Dumptor has over 6 HP per ton of loaded weight — accelerates fast, pulls through soft ground and up grades with less shifting — climbs 24% grades fully loaded. See what these Dumptor advantages can mean in more work-time, less down time on your jobs. Call Koehring distributor for full details, or send for catalog.

KOEHRING Company

Milwaukee 16, Wisconsin

Subsidiaries: JOHNSON PARSONS • KWIK-MIX

K340

NEW!

EIMCO 105's are new equipment for mining, construction, quarry, tunneling, logging, oil fields, farming or any job requiring a thoroughly tough unit as a prime mover, bulldozer, or loader.

Machines are designed, usually, for a weight limit to sell at a price OR THEY ARE DESIGNED FOR SERVICE. EIMCO machines have always been designed for service — weight and price receive no consideration. The result in this case is a unit designed to give maximum life — (3 to 4 times more than ordinary equipment in the same class) — with minimum maintenance attention. Trouble free service for many years on the job.

Construction is rugged, with each piece designed for maximum loading conditions — using the most modern metallurgical research and best in tooling and equipment. Each part is processed to give it toughness and hardness in the right places.

On the EIMCO 105 you'll find no weak spots designed to produce repair parts sales. No bulk weight spots to provide "cheap beef". Every part is functional — made of steel — fabricated, or alloy steel forgings and castings. The 105 is powered to give maximum effective use of every ounce of energy applied.

See this unit in action — operate it yourself. There is nothing like it anywhere! You'll be amazed at the easy controls, the performance — the simplicity. Write for more details.

The Eimco Corporation, manufacturers of heavy mining, construction and processing equipment and has been serving industry since 1884. With its own complete manufacturing facilities, which include iron and steel foundries, steel fabrication shops, forge and press shops, complete machine and assembly shops, laboratories, research, testing and process development departments. Eimco controls the manufacture of the product from pouring of the metal to testing of the finished product.

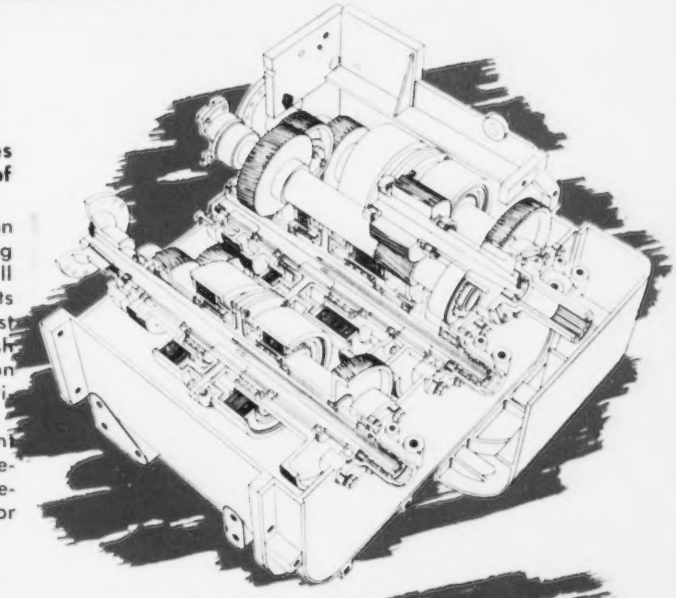
LOADER—WITH COST SAVING ADVANTAGES

NEW Eimco Transmission:

Eimco's great new Unidrive achieves supremacy in engineering advancement of tractor power transmissions.

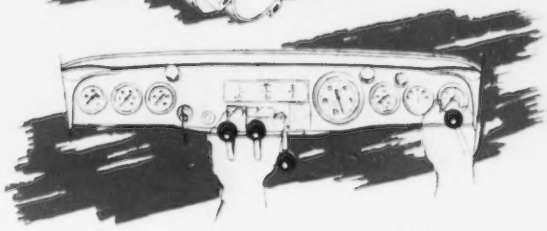
The Unidrive is a compact transmission containing in one unit all of the gearing and clutches for speed changing and full independent reversal of each tracks. Its unique design combines all of the best features of torque converter, constant mesh gearing, hydraulically actuated friction clutches and sealed oil bath, pressure lubrication of all wearing parts.

The oil-cooled, positive engagement clutches never need adjustment. The precision helical gearing is alloy steel, carefully heat-treated and micro-shaved for years of quiet operation.



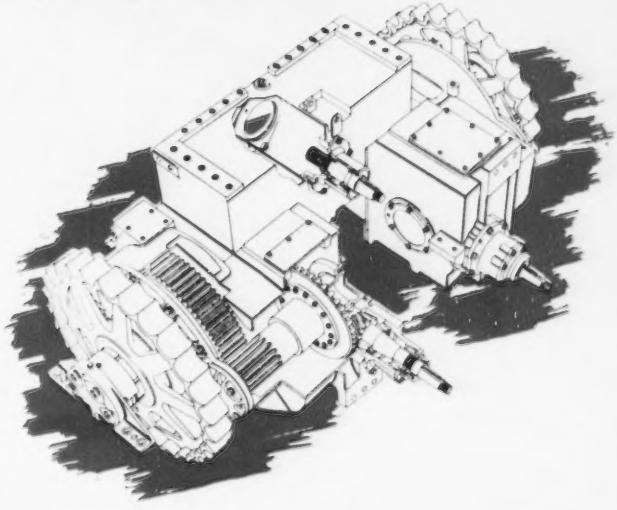
NEW Controls and Instruments:

The Eimco 105 may be operated by one hand covering two small levers. Push for forward motion, pull for reverse motion. Each lever controls the track on its respective side, a twist of the wrist starts one track in forward motion and the other in reverse for a spin turn or release one handle and it will automatically return to neutral for a gradual turn. Attachments, such as the Eimco loader can be operated by the other hand.



NEW Final Drive:

Each track is equipped with its own final drive in a cast steel case with a cast steel cover. These final drives do not house clutches or troublesome gadgets. They are sturdy heavy-duty parts carefully machined for silent operation and long service under unusually difficult job conditions.

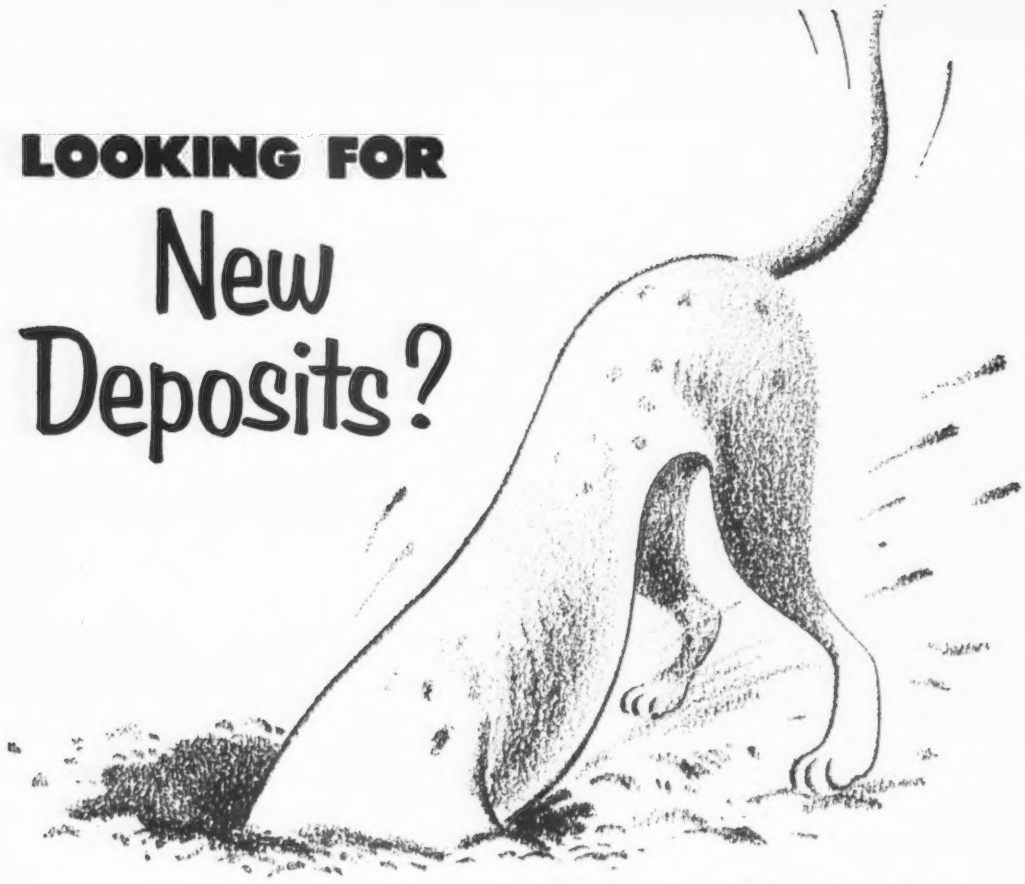


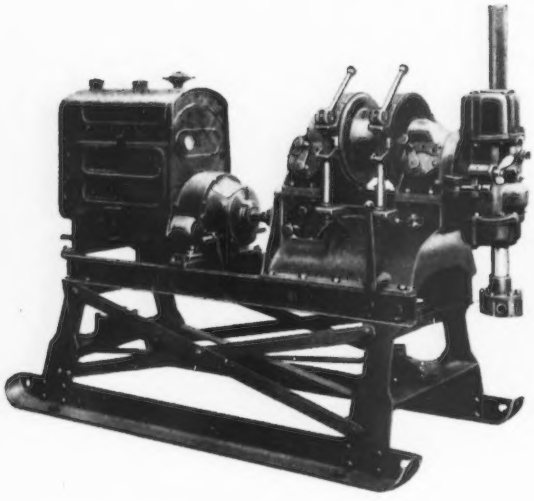
NEW Many Other Features:

There are many other features in the 105 such as: instant reverse at all speeds, torque converter cushioned drive, air cooled precision disc brakes, all metallic clutch facings, full flow oil filters, force feed lubrication, adjustable digging depth stops, variable height discharge, 1½ to 2½ cubic yard buckets and many others.

THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
Export Office: Eimco Bldg., 52 South St., New York City

LOOKING FOR New Deposits?





Whether you're mineral prospecting or looking for extensions of existing deposits, you'll wind up with the right information easier and faster by using the skid mounted CP-8 and CP-15 Diamond Core Drills. Specifically engineered to withstand the continued high drilling speeds made possible by bortz bits, they're available with gas, diesel or electric drive for surface drilling and air drive for sampling underground. And they can be readily moved from hole to hole under their own power. Bolted frame permits easy disassembly for transportation to remote sites. With E-EX fittings the CP-8 has capacities to 1250 ft., the CP-15 to 2250 ft. For more complete information, write: *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

WHAT ARE YOUR BEST BUYS IN TIRES ?

All-Weather, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

AREN'T they the tires that take your toughest jobs in stride? Those that show you more profits in more work well done? Those that live the longest, most useful lives—with minimum down time for *any* reason?

Here's why so many truck users say the best tire buy is a Goodyear:

Goodyear has built and sold 600 million pneumatic vehicle tires *alone*—more tires for more specific uses than anyone else on earth. That is because the public has learned from experience that Goodyear tires are standouts in all-round performance—*that Goodyears give you extra dependability, extra safety, extra mileage!*

So when you buy or specify Goodyear, you get all this EXTRA value without extra cost! Let your dealer prove it to you. Goodyear, Truck Tire Dept., Akron 16, Ohio.

HARD ROCK LUG
for tire-killing work.

SURE-GRIP
top choice for traction.

ALL-WEATHER
for maximum flotation.

FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE!

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

HERE'S HOW TO . . .

Put the brakes on

U·S·S High Strength Steels cut costs by

A lot of your money goes into hard-working equipment. Certainly, you have to make that original investment. But when equipment breaks down . . . when parts wear out, it means you have to spend *more* money for replacements, labor and repairs. It also means that you lose output while essential equipment is down.

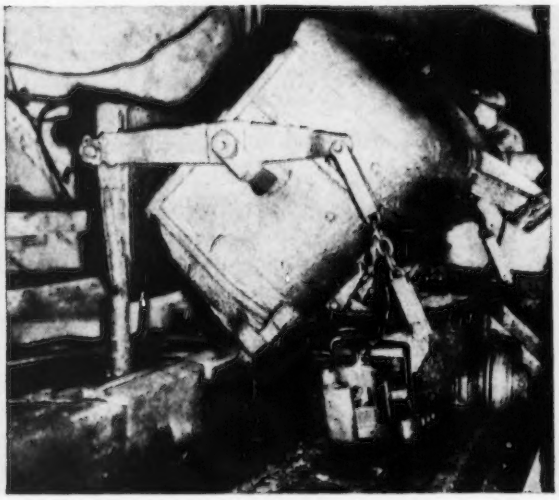
This is sheer waste! And you can stop it!

It's agreed that premature equipment failures are usually caused by corrosion, abrasion, the effects of shock, often at sub-zero temperatures, constant hard usage and accidents.

But you can get maximum resistance to these destructive forces by using U·S·S High Strength Steels in vital parts. Each of these famous steels was designed to resist certain types of attack. By the use of the right steel, or combinations of these steels to meet your particular con-

UNITED STATES STEEL
USS HIGH STRENGTH STEELS
1933 1953
TWENTY YEARS OF PERFORMANCE

THIS 26½ CUBIC YARD dump trailer, built by Trailmobile Co., was made stronger and more resistant to atmospheric corrosion by the use of U·S·S COR-TEN steel. What's more, the use of COR-TEN steel permitted a weight reduction of 1,000 pounds.



IN A WESTERN COPPER MINE, twenty-two 74-cu. ft. mine cars like this, built by C. S. Card Iron Works Company, were put into service eleven years ago. ¼-in. COR-TEN steel was used in body and floor plates. Each car has handled over 85,000 tons of highly abrasive ore. How's that for stamina?

runaway costs!

increasing life and reducing maintenance

ditions, you can give your equipment the stamina it needs to stay on the job.

Take U·S·S COR-TEN steel, for example. . . . This pioneer high strength steel has a yield point of 50,000 psi, plus 4 to 6 times the resistance to atmospheric corrosion of plain steel.

U·S·S TRI-TEN steel has the same high strength, plus an unusual ability to withstand shock at sub-zero temperatures. What's more, it has good welding qualities and formability.

And U·S·S MAN-TEN steel, though it costs slightly less, also has a 50,000 psi yield point, as well as weldability and formability.

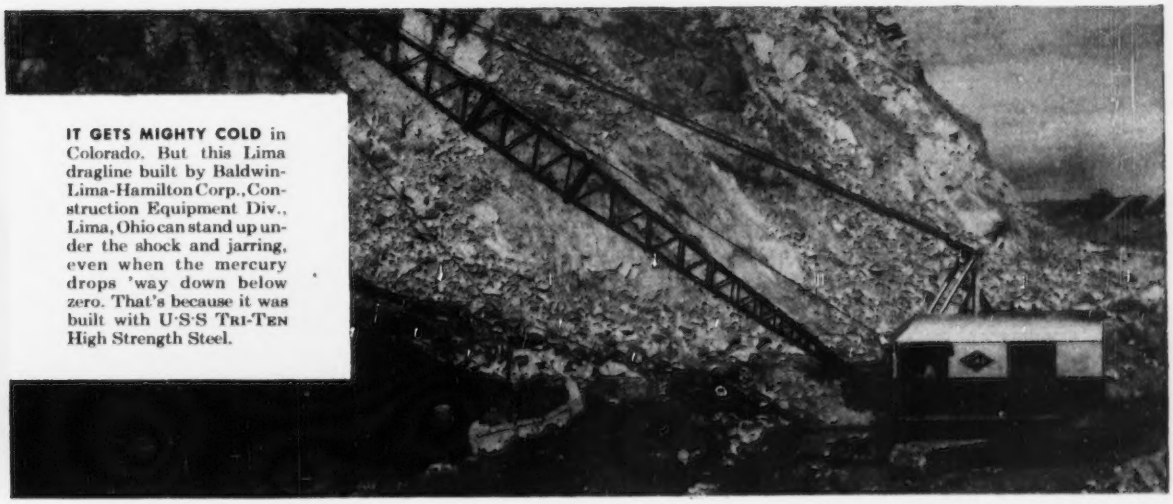
Any of these steels—when used in the same thickness as you'd use ordinary steel—will increase strength up to 50% and greatly increase your equipment's ability to withstand the abuse of today's high speed operations, the jarring and twisting of heavy loads and the damaging effects of sudden impact. Yet, *the weight of that equipment will be no greater than that built of ordinary steel.*

If, on the other hand, you want to *reduce* equipment weight without reducing the strength factors you have now, simply use one of these high strength steels in lighter sections than you'd use plain steel.

Increased equipment strength and/or lighter weight mean longer life . . . less maintenance . . . fewer replacements . . . a substantial reduction in your costs.

Contact our nearest office for complete information. We'll show you exactly where and how these famous steels can be applied in your mine, and point out the savings you can expect.

Call today.



IT GETS MIGHTY COLD in Colorado. But this Lima dragline built by Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio can stand up under the shock and jarring, even when the mercury drops 'way down below zero. That's because it was built with U·S·S TRI-TEN High Strength Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S High Strength Steels

UNITED STATES STEEL

GARDNER-DENVER
is first again!

now it's the "Blast Hole" drill designed especially for percussion deep hole drilling

the NEW Model SFH99

A Natural Partner — with Carbide Bits and Superior Gardner-Denver Alloy Sectional Rods and Couplings — for Low Cost Blast Hole Drilling.

Permits a 4' change in a 7' drift—saves time and development work.

Superior chuck construction—1½" x 3 13/16" shank rod locked in chuck—results in longer life for hammer, tube, chuck, shank rod and ring seal.

Locked-in shank rod prevents loss of rod string on down holes.

Heavy-duty centralizer supports rod string during rod changes—simplifies up-hole drilling.

Reverse rotation and locked-in shank rod enable operator to uncouple rods quickly and easily—using power from the drill and only one wrench.

Delivers high-pressure water or air through chromium plated tube and Ring Seal Shank.

Lightweight aluminum alloy guide shell—reversible for extra life. Movable cone.

Write today for complete details.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 13, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

"Traylor-Made" to Produce a Profit

1. The Meehanite* metal frame of box section design provides maximum strength. Uniform metal thickness and annealing in the sand insure castings free from flaws, shrinkage, cracks and checks.

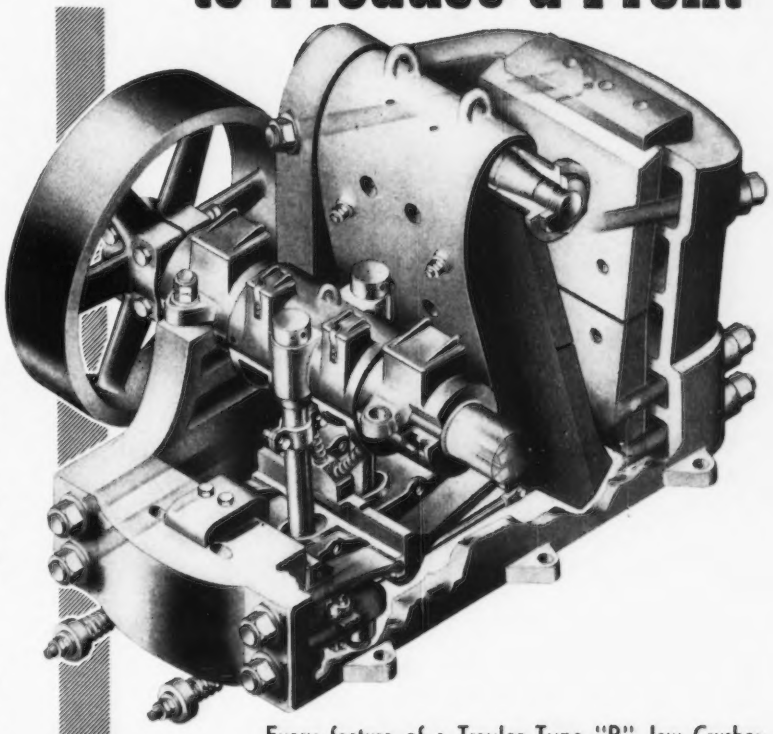
2. Forged steel rods of extra large diameter are an integral part of the very strong pitman which is relatively light in weight.

3. Traylor swing jaw suspension holds the swing jaw shaft in a fixed position. This materially reinforces the top of the frame.

4. Heavy steel reinforcing rods are shrunk in place on each side at the top of the crushing chamber and through the strengthening band at the bottom of the frame.

5. The non-chokable, curved jaw plates of original Traylor design are made of manganese steel. They outwear conventional plates, often by as much as 3 to 1.

*T.M. Reg. U.S. Pat. off.



Every feature of a Traylor Type "R" Jaw Crusher is designed to produce profits for you. Greater hourly tonnages, lower maintenance costs, reduced power costs all add up to more efficient and profitable ore reduction. For over half a century Traylor has been producing heavy-duty crushing machinery designed for service under the most severe operating conditions. For more complete information on "Traylor-Made" profits, mail coupon for free bulletin on the Traylor "R" Jaw Crusher.

Traylor

TYPE "R" JAW CRUSHERS

TRAYLOR ENGINEERING & MANUFACTURING CO.
1562 MILL ST., ALLENTOWN, PA.

Send free bulletin on a "Traylor-Made" Type "R" Jaw Crusher.

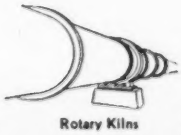
Name _____

Company _____

Address _____

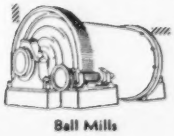
SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

Primary Gyratory Crushers

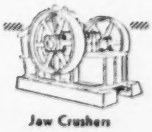


Rotary Kilns

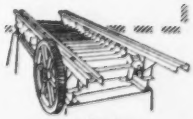
Secondary Gyratory Crushers



Ball Mills



Jaw Crushers



Apron Feeders

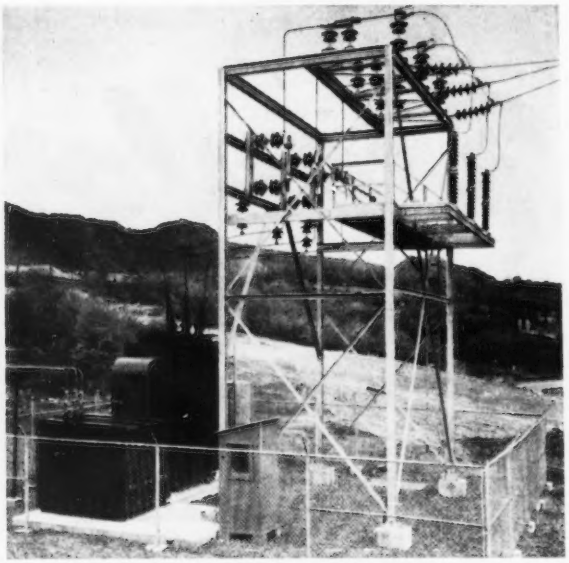
ENGINEERING REPORTS:

Photograph courtesy of Kennecott Copper Corporation

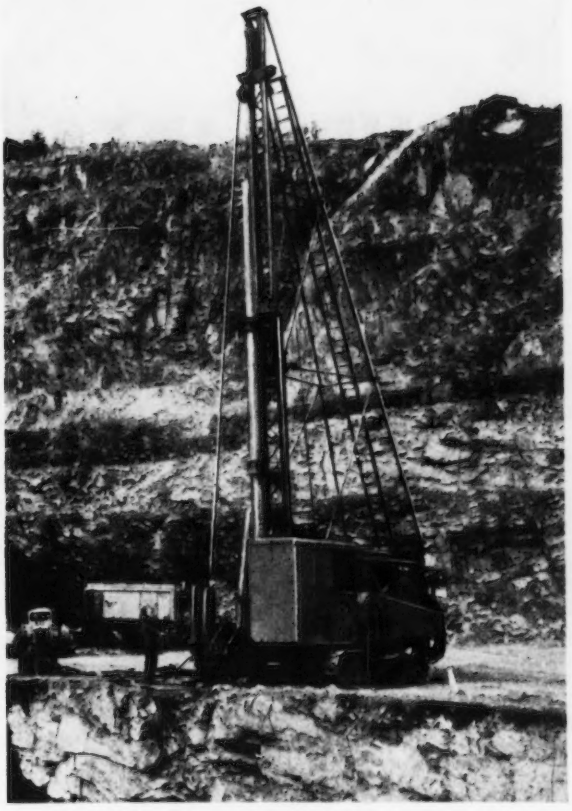
1 STEP UP SHOVEL SPEED, CAPACITY. This shovel performs faster, more smoothly, thanks to its simple, rugged G-E drive system. Usable torque is increased. Response and acceleration are improved. Amplidynes, which control shovel motions precisely, prevent excessive current and torque peaks which might damage electrical and mechanical equipment.

5 ways modern electrification can

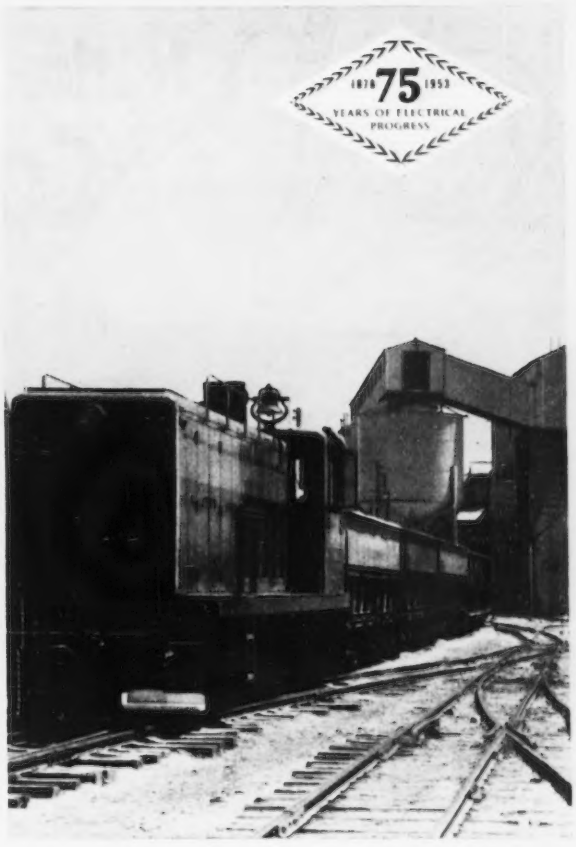
4 MAKE POWER SYSTEM MORE FLEXIBLE. This standard G-E cable-skid switch house has polarized couplers to simplify and speed up cable interchanging. Skid house is easy to move.



5 IMPROVE POWER SYSTEM PROTECTION. Magne-blast breakers in G-E master unit substation protect feeders; lightning arresters help guard substation against outage.



2 INCREASE DRILL FOOTAGE. This self-contained churn drill, powered by G.E., delivers rapid rock penetration—promoting more efficient drilling and blasting practices.



3 HAUL MORE ORE. General Electric 70-ton diesel-electric locomotive has high availability. It maneuvers rapidly, efficiently, helps speed all switching operations.

help you mine more tons per day

G-E engineered electrical systems mean faster open pit mining at less cost

You need speed, flexibility, and safety in your open pit mining operations if you are to meet present demands for higher production per man-day. ***Modern electric power*** is the key. Here's what it helps you to do.

1. You can speed up the digging cycle. G-E amplidyne-controlled drives provide faster hoist, swing, and crowd action on power shovels. Shovels work around the clock with minimum time lost for maintenance or repairs.

2. You can step up drilling efficiency. Modern rotary and churn drills, powered by General Electric, are self-propelled. Smooth, fast motor control helps them to drill harder rock at higher speeds.

3. You can haul greater tonnages. G-E diesel-electric locomotives withstand hard work cycles. Units can be operated close to the wheels' slipping point even with heaviest loads.

4. You can cut re-location time. G-E cable-skid switch houses give a more flexible power system arrangement. Moving is simplified. Cable connecting time is minimized.

5. You can increase mining efficiency and safety with portable G-E unit substations. They improve voltage levels—make full equipment capacity available. Distribution losses are reduced. Grounding systems help protect personnel and equipment.

These production-boosting techniques can be applied to your surface mining operation. A G-E mining industry specialist can show you how. Contact him at your nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, New York.

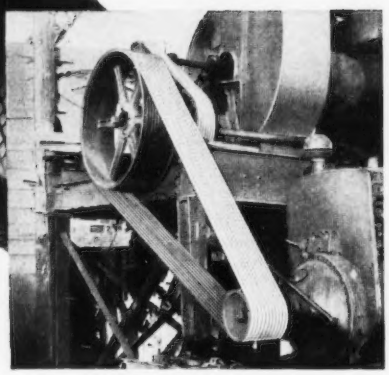
660-29

Engineered Electrical Systems for the Mining Industry

GENERAL ELECTRIC

Notice the CONCAVE SIDES (U.S. PATENT NO. 1813698) of the Gates V-Belt-

. . . that's why Gates V-Belts Last Longer!

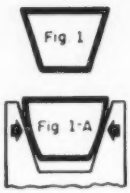


Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

Look at this!

In *half a minute* you can prove for yourself the belt-saving advantage of the CONCAVE SIDES.

Take any *straight-sided* V-Belt (Fig. 1) and bend it as it bends in going around its pulley. At the same time, grip its sides with your fingers and *feel* those sides *bulge out* as in Fig. 1-A.

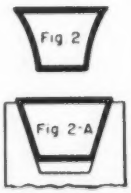


Clearly, those bulging sides will press *unevenly* against the V-pulley—and this causes extra wear at the points shown by the arrows (Fig 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

As the belt bends, grip its sides—and you will feel the precisely engineered CONCAVE SIDES *fill out* to an *exact fit* in the sheave groove (Fig. 2-A).

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means *longer* belt life and *lower* belt costs for you!



When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES— The Gates Vulco Rope.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-537

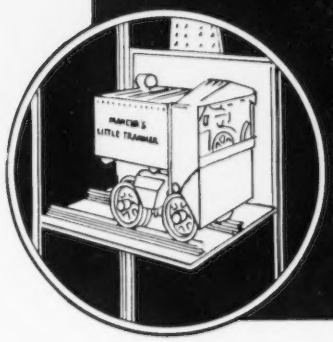
V-Belts — Hose Molded Rubber Goods for industry World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

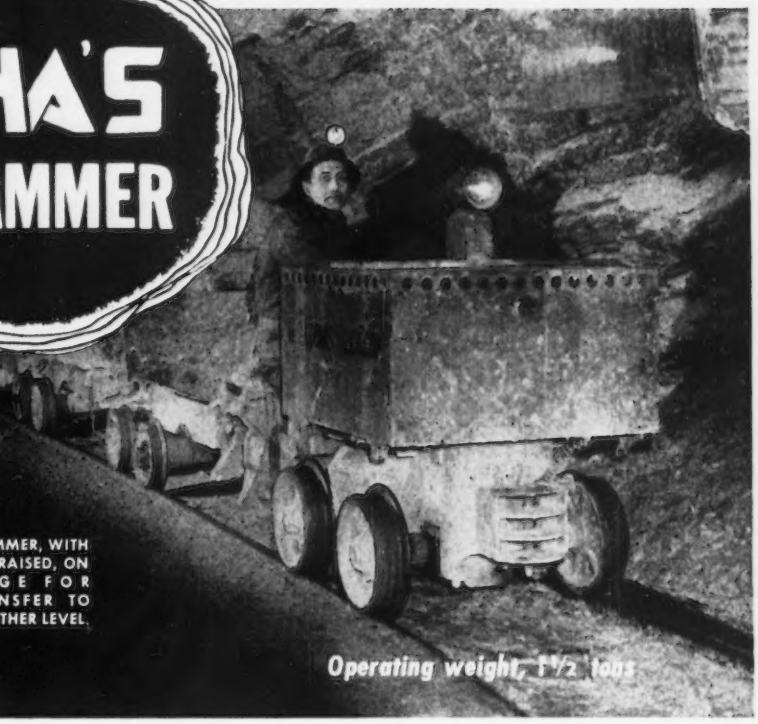
THE GATES RUBBER COMPANY • DENVER, U.S.A.

Mighty midget with a king-size production record!

MANCHA'S LITTLE TRAMMER



TRAMMER, WITH CAB RAISED, ON CAGE FOR TRANSFER TO ANOTHER LEVEL.



Operating weight, 1½ tons

For haulage duty . . . for moving mucking machines and drill jumbos . . . timber and supplies . . . or man trips to distant workings, Mancha's Little Trammer is the choice of mine operators everywhere.

If you'd see one of these powerful little locomotives in action, you'd see why. It's rugged and safe. It's small enough for work in narrow, crooked drifts, and easily transported from level to level. Climate, altitude and poor ventilation cannot slow it down. Maintenance cost is surprisingly low. Quite likely a Mancha's Little Trammer will more than pay its own way in your mine operations. Write for our mine haulage Data-Form and find out. There's no obligation on your part.

Mancha Storage Battery Locomotive
Division GOODMAN Manufacturing Company
4850 South Halsted Street, Chicago 9, Ill., U.S.A.
E AND MJ 1153
Send your mine haulage data form.

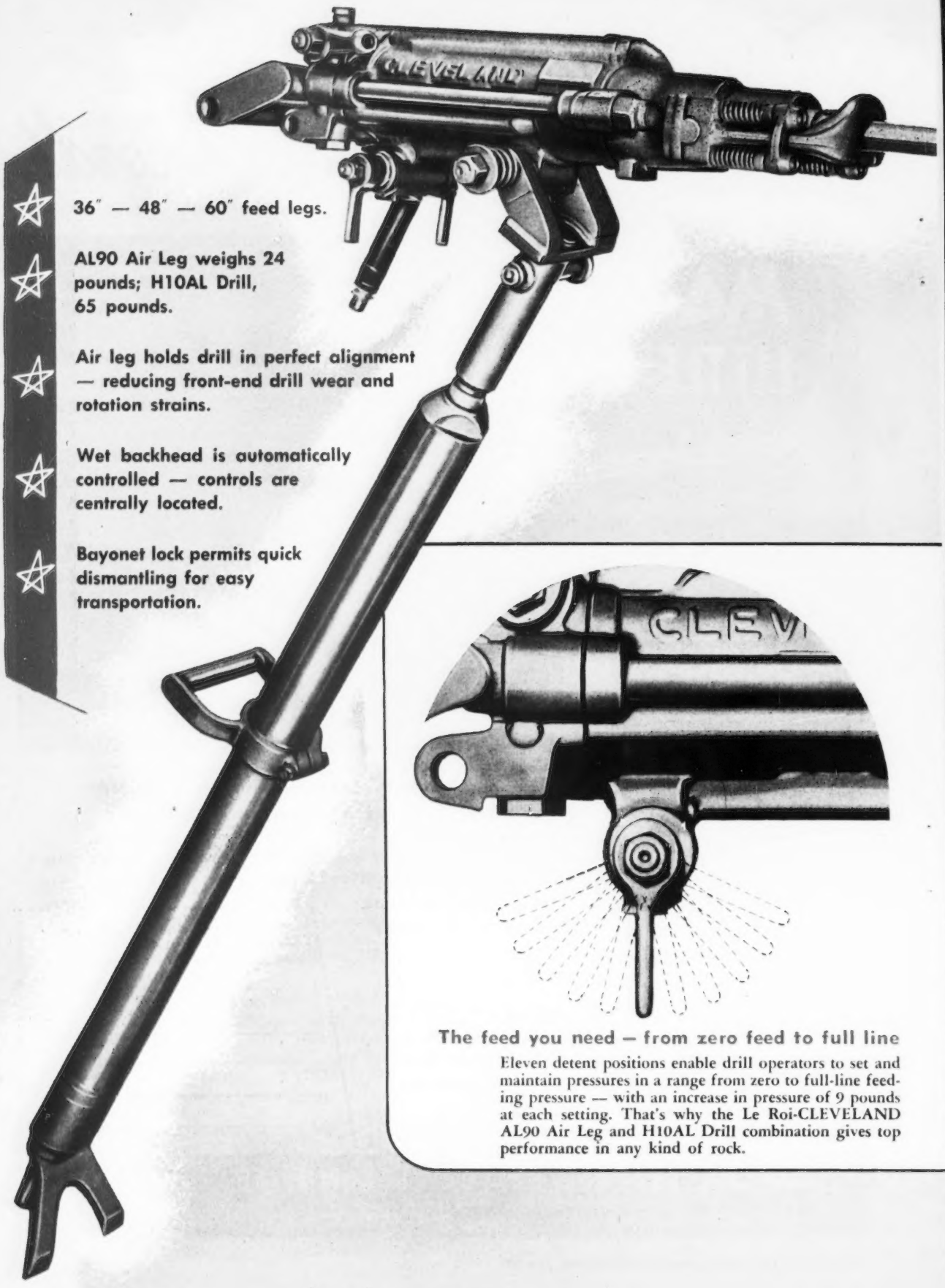
NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

MANCHA STORAGE BATTERY LOCOMOTIVE
Division **GOODMAN** *Manufacturing Company*
4850 SOUTH HALSTED STREET CHICAGO-9, ILL., U. S. A.



- 36″ — 48″ — 60″ feed legs.
- AL90 Air Leg weighs 24 pounds; H10AL Drill, 65 pounds.
- Air leg holds drill in perfect alignment — reducing front-end drill wear and rotation strains.
- Wet backhead is automatically controlled — controls are centrally located.
- Bayonet lock permits quick dismantling for easy transportation.

The feed you need — from zero feed to full line

Eleven detent positions enable drill operators to set and maintain pressures in a range from zero to full-line feeding pressure — with an increase in pressure of 9 pounds at each setting. That's why the Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill combination gives top performance in any kind of rock.

You're ahead 3 ways:

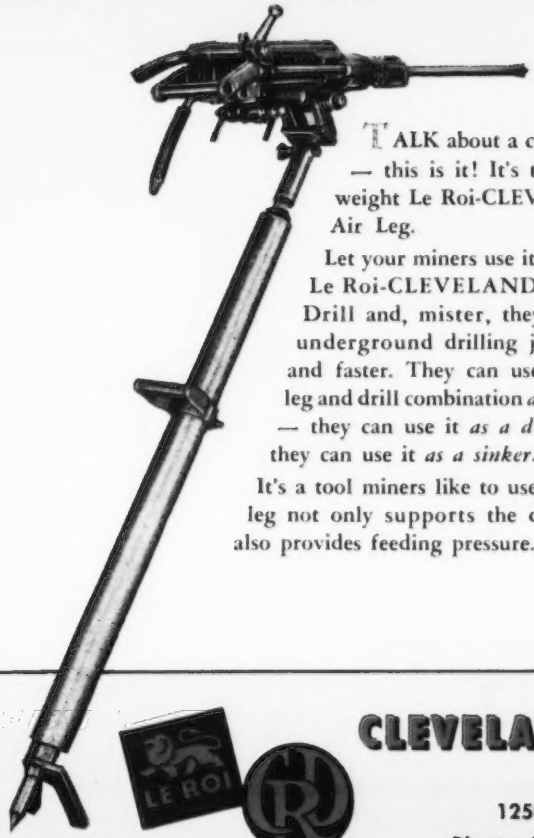
☆1. Easier Drilling

☆2. Greater Footage

☆3. Lower Costs

—with LeRoi-CLEVELAND AL90 Air Leg and H10AL Drill

and exclusive feed control!



TALK about a cost-cutter — this is it! It's the lightweight Le Roi-CLEVELAND Air Leg.

Let your miners use it with the Le Roi-CLEVELAND H10AL Drill and, mister, they do any underground drilling job easier and faster. They can use this air leg and drill combination *as a stoper* — they can use it *as a drifter* — they can use it *as a sinker.*

It's a tool miners like to use. The air leg not only supports the drill, but also provides feeding pressure. And the leg absorbs any recoil. Miners' work is easier; they are less tired at end of the shift.

But that's not all! The feed control is built in — eliminates the necessity for a third hose and cumbersome "Y" connections. There's no feed-control bleed valve — the operator does not have to continually bleed-off air, to maintain suitable feeding pressure. He can change or advance the position of the leg easily and quickly.

Increase your footage — lower your drilling costs — ease the load on your men. Put the versatile Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill to work for you. Write today for complete information.

RD-51

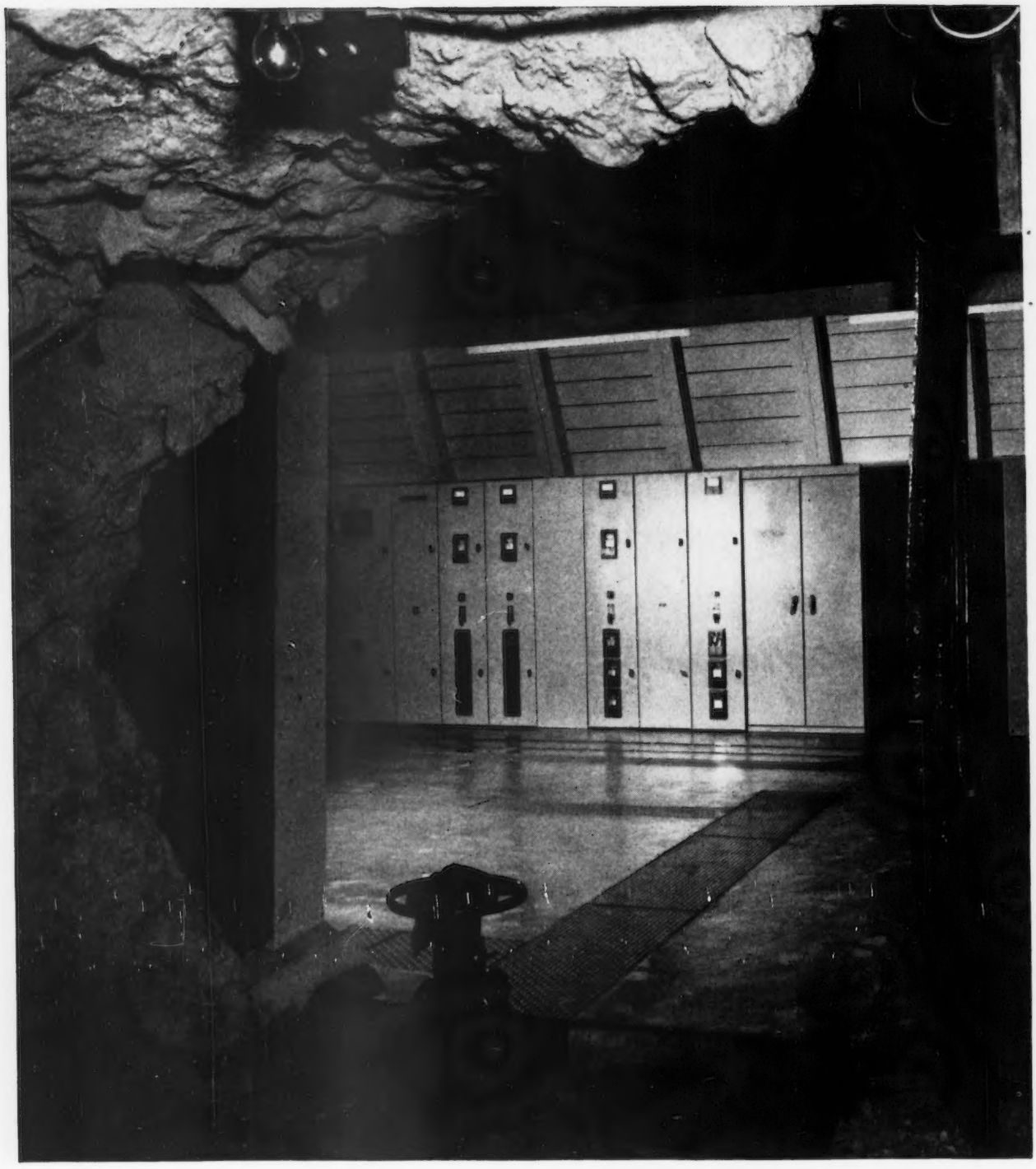
CLEVELAND ROCK DRILL DIVISION

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.

12500 Berea Road • Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, Ohio



Compact Westinghouse power centers give Silver Summit excellent voltage regulation because they were compact enough to be installed close to the load. Shipped as completely assembled and tested units, they reduced installation expenses.

Does this picture answer your mine's growing power problems?

If your power system isn't keeping pace with growing operations, you may get some good ideas from this Westinghouse installation in the Polaris Mining Company's Silver Summit mine in Idaho. Rapid growth, plus the discovery of new ore bodies, made the old distribution system inefficient and hazardous. Westinghouse helped the Mining Company's engineers plan a new 13,200-volt primary distribution system with underground power centers for low-voltage requirements.

13,200-volt system and power centers lick problems

The original 2400-volt system had high line losses because power was carried by long, cumbersome cables. Also, there was a serious thermal capacity problem because each piece of additional equipment put more load on already overloaded cables. Now, there is ample power for all present and future needs. By locating efficient Westinghouse power centers close to the load, short cables carry power where it's needed. Voltage regulation is excellent and thermal capacity problems don't exist.

Safety, dependability, low maintenance

Old oil-filled transformers and circuit breakers were mounted in any suitable space that could be found. Preventive maintenance was difficult due to the lack of flexibility in the system. As a result, there was a fire hazard because the breakers often failed to interrupt their rated capacities. Now, modern Westinghouse air-cooled transformers and air circuit breakers give Silver Summit absolute safety and dependability. There's no oil to explode, the units are foolproof, and require hardly any maintenance . . . just an occasional check.

Inexpensive installation

Installation costs were low because all Westinghouse equipment was shipped completely assembled, pre-tested and ready to hook up.

Westinghouse can help you plan your power system

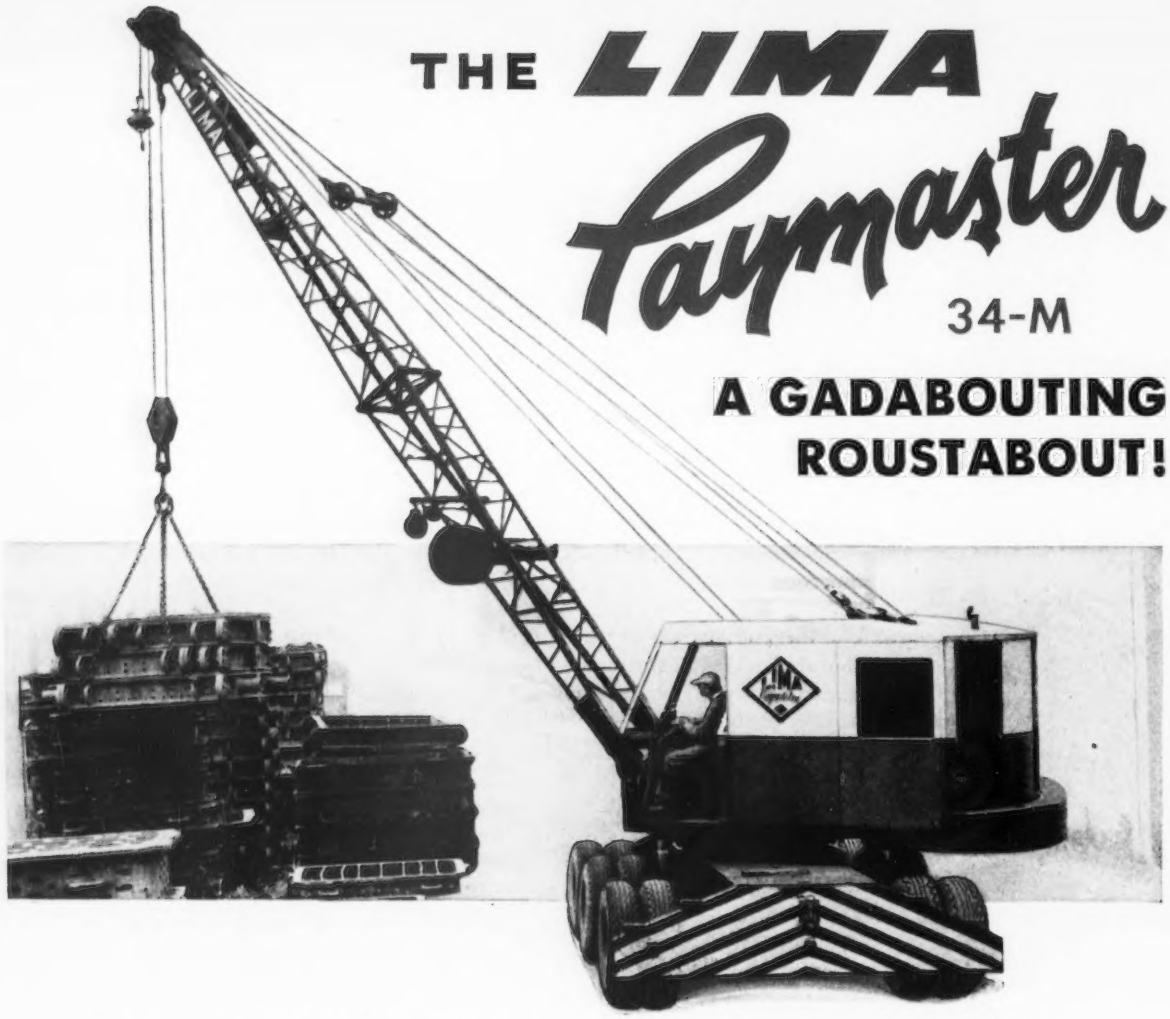
Overloaded and outdated power systems are often causes of repeated trouble and costly delays in production. Ask your Westinghouse representative to help you plan a modern, trouble-free distribution system for your mine or surface plant. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94985

YOU CAN BE SURE... IF IT'S

Westinghouse

THE LIMA Paymaster 34-M

A GADABOUTING ROUSTABOUT!



We mean this Lima Type 34-M crane mounted on a 12 wheel undercarriage . . . *gadabouting* because it can rove anywhere that anything on wheels can go . . . *roustabout* because it's the ruggedest handyman you can have around your plant.

This Lima Paymaster on wheels can save you time and money on a great variety of material handling jobs. As a crane it can lift up to 20 tons, loading and unloading shipments, handling scrap, equipment or materials. (See above photo where it is stacking mould flasks at a foundry.)

It is also easily converted to a shovel, dragline or pullshovel, making it ideal for handling sand, gravel or raw materials, digging ditches, sewers, general construction.

We would like very much to have a chance to send you more information about how this rubber-mounted Lima Paymaster can handle material for you faster and more economically. Please write to—

LIMA DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA
SHOVELS • CRANES
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BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
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136

CF&I ROCK BOLTS

for GREATER SAFETY GREATER ECONOMY BETTER HOUSEKEEPING...

CF&I Rock Bolts—slot and wedge, or the new expansion shell type with Pattin shell—are the standard of quality throughout the West. Investigate this modern means of roof and wall support. Write for complete information.

IN THE HEART OF THE WESTERN MINING AREA
PUEBLO ♥ COLO.

CF&I ROCK BOLTS
THE COLORADO FUEL AND IRON CORPORATION
DENVER • NEW YORK • OAKLAND

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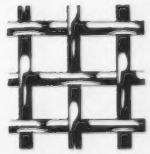
CF&I Steel Products for the Mining Industry

Grinding Balls

Grinding Rods

Wickwire Rope

Mine Rails and Accessories


Cal-Wic Industrial Screens

From Cyanamid Research

New Chemicals for Thickening and Filtration

AEROFLOC* REAGENTS

now in commercial use in plants concentrating precious metal, base-metal and non-metallic ores and coal

for

Speeding-up and Effecting More Complete Settling; Conserving Values Previously Lost to Thickener Overflow

Increasing Filter Capacity • Reducing Moisture in Filter Cake

These new Cyanamid Reagents flocculate fine particles into larger clusters thereby accelerating settling rates in thickeners or changing filter cake characteristics to increase filtration rates.

AEROFLOC* Reagents and their applications have been extensively investigated in Cyanamid Mineral Dressing Laboratory on metallic and non-metallic ores, including sulfide concentrates, flotation and cyanidation tailings, slimy gold and iron ores, coal, etc., etc. They are now in successful use in plants treating Copper, Zinc, Manganese, Molybdenum, Tungsten, Gold, Fluorspar, Coal and many other minerals. Typical results in mill operation include:

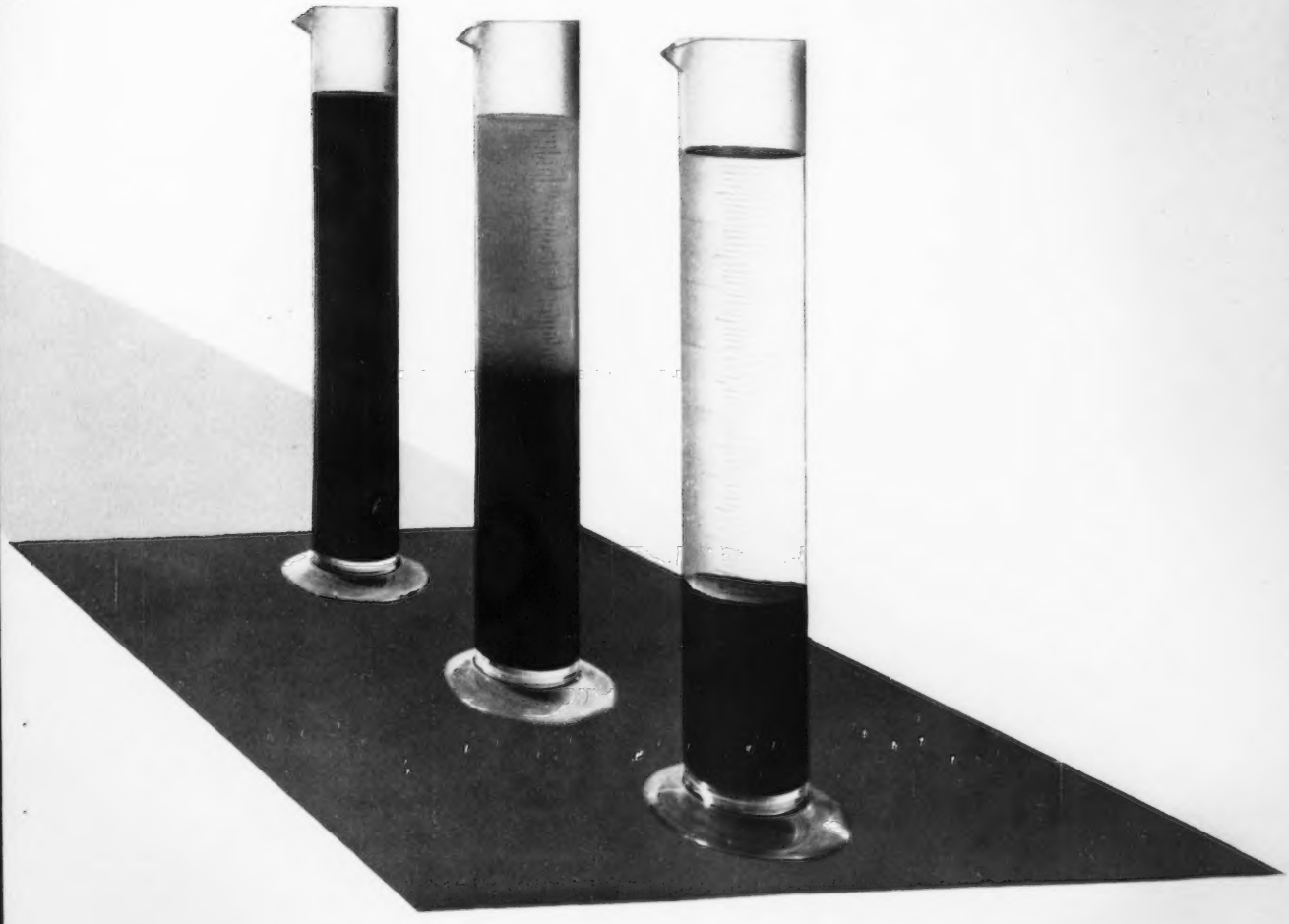
APPLICATION	QUANTITY	RESULT
Clarify Effluent from Coal Preparation Plant	0.013 lb. AREOFLOC 548 per 1000 gal. effluent	Thickener overflow reduced from 0.15% to 0.005% solids . . . clear enough to discharge into stream.
Thickening Non-sulfide Pulp	0.04 lb. AEROFLOC 552 per ton of dry solids	Loss of values in thickener overflow has been cut to less than 1% of that formerly lost.
Thickening Cyanide Pulp in CCD Plant	0.01 lb. AEROFLOC 548 per ton of dry solids	300% increase in settling rate; clear overflow.
Thickening Pulp in Non-Metallic Mill	0.03 lb. AEROFLOC 548 per 1000 gal. feed to thickener	Reduced solids content in thickener overflow from 0.025% to 0.006%. Present thickener now handles increased mill-tonnage.

*TRADE MARK

FOR FILTRATION—AEROFLOC* REAGENTS can

1. Increase filtration rates, make filter cakes firmer and more porous, help to prevent blinding of filter cloth and increase washing ease and efficiency.
2. Reduce capital expenditure by increasing capacity of filters.
3. Produce tailings for backfill that have a higher percolation rate, with the result that they settle faster and more firmly.

Often when filtering pulps thickened with AEROFLOC* Reagents these advantages accrue without further addition of AEROFLOC.



Several grades and types of AEROFLOC Reagents are currently available. Cyanamid Field Engineers are familiar with commercial results obtained with these reagents on a variety of ores in many mining fields. They will be happy to work with you on possible uses in your mill, to provide samples for mill-laboratory tests, and to arrange for delivery of quantities sufficient for your mill tests.

A letter or telephone call to the nearest Cyanamid Field Engineer or Cyanamid Office will get prompt and intelligent attention.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK

Trouble brewing on foreign soil...
Sound Insurance protection is vital

In India, Sweden or Venezuela, chemicals sometimes become troublesome—human error creeps into the laboratories of American business. That is when *sound* insurance protection through the member companies of American Foreign Insurance Association can prevent serious financial loss from explosion, fire and liability.

For over three decades AFIA has been serving the foreign insurance needs of practically every type of American business. This experience gives AFIA knowledge of the numerous perils confronting each field of endeavor. What is equally important, it knows conditions abroad and keeps well informed on the laws, insurance regulations and requirements of foreign lands . . . for your protection.

And if trouble strikes, there is an AFIA claims-settling agent nearby ready to give you prompt and efficient service.

Ask your insurance agent or broker to contact AFIA for full information on any specific risk.

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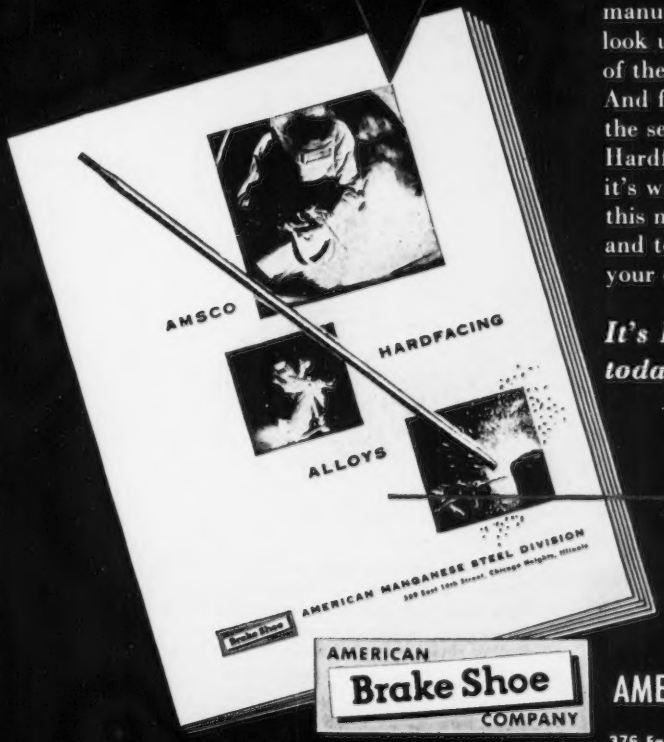
are you using hardfacing effectively ?

BE SURE—READ AMSCO'S NEW CATALOG ON HARDFACING ALLOYS

Whatever the application, whenever you are in doubt about what hardfacing alloy to use, you can reach for the new Amsco Catalog for the answer. It gives you complete analyses, metallurgical information, and other pertinent data about Amsco's line of automatic and manual hardfacing alloys. You can look up the right rod to use for hundreds of the more common applications. And for those extra tough jobs, you'll find the section on How to Select a Hardfacing Alloy indispensable. Although it's written by welding engineers, this new catalog is easy to understand and to apply its suggestions to your own operations.



It's FREE—write to Amsco today for your copy

AMERICAN Brake Shoe COMPANY

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FARVAL SPRAY VALVES save 95% of lubricant and do 100% better job

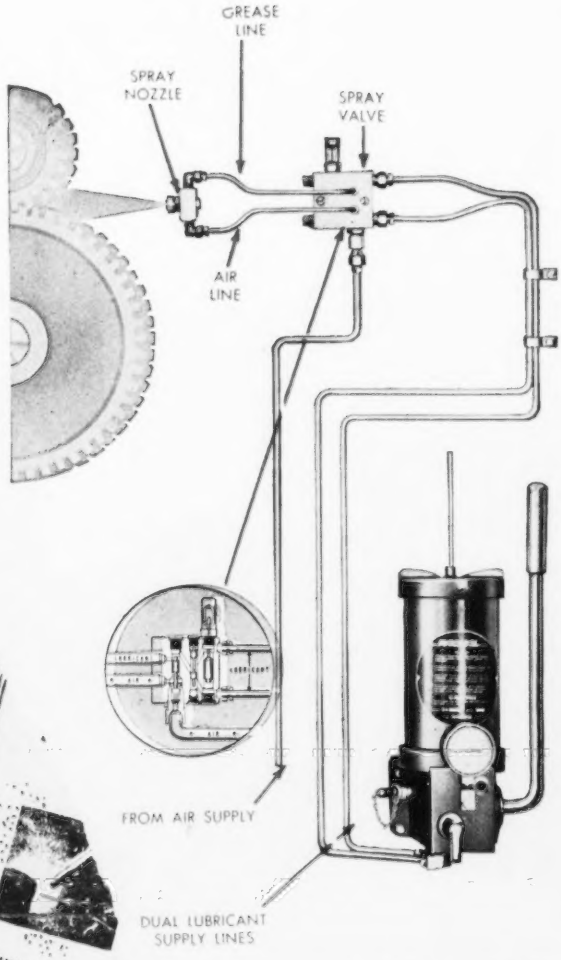
FARVAL—*Studies in Centralized Lubrication* No. 149

COUNT the number of open gears on your machines. Multiply the amount of grease required for these gears by 95% and you'll have the savings in lubricant alone which Farval Spray Valves can bring.

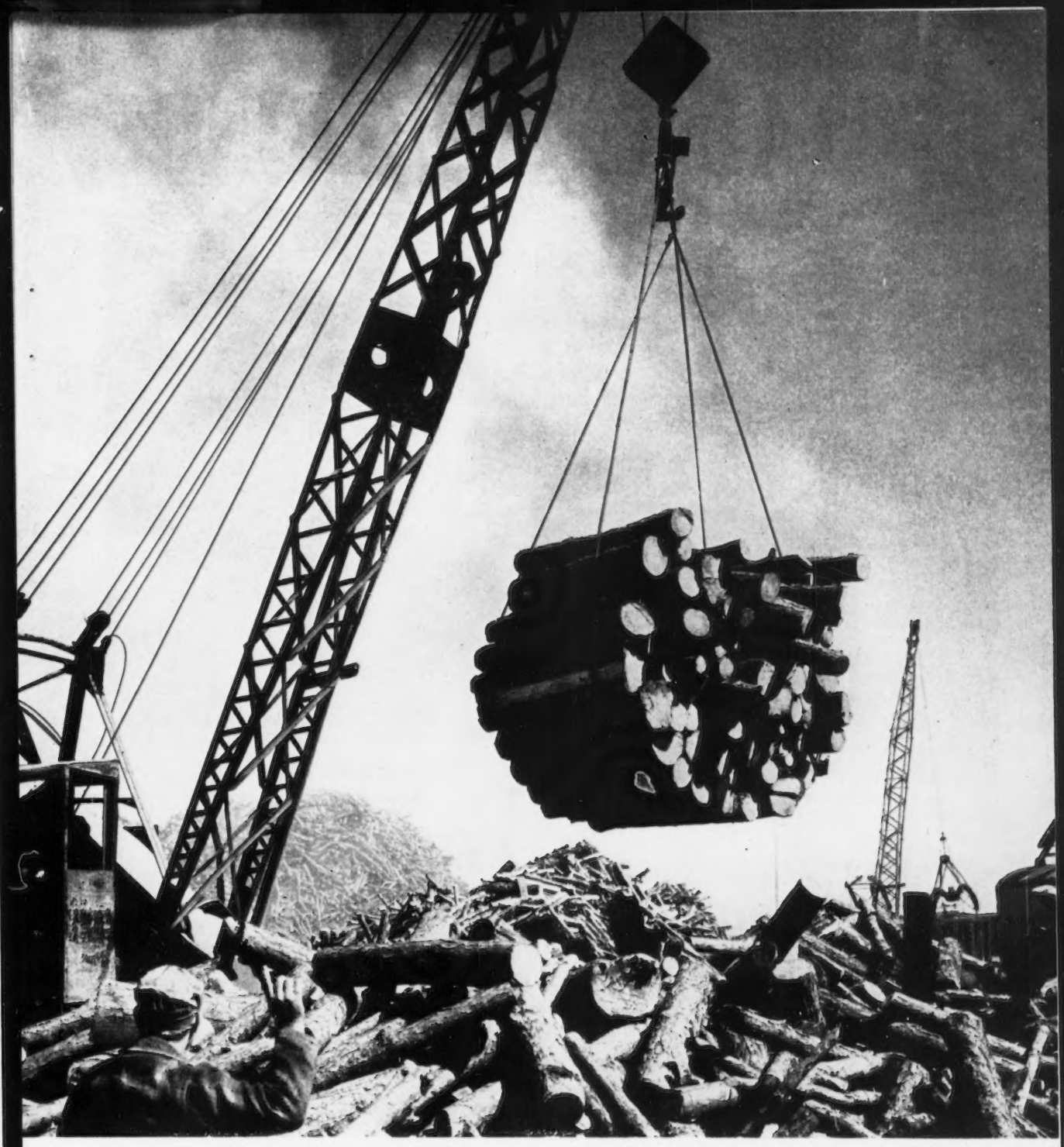
Even more important than lubricant saving, the Farval Spray Valve spreads and maintains a uniform thin film of oil or grease evenly over all bearing areas —eliminates friction, increases efficiency, lowers power costs, reduces wear.

The Farval Spray Valve System is designed especially for lubricating open gearing and slide surfaces. Using an adaptation of the familiar Dualine Valve, this system sprays oil or grease from nozzles in just the right amount and at any desired interval.

No more wasteful hand paddling of lubricant on gear teeth with the hope it will spread itself uniformly. No more blobs of grease splotching up the floor— [illegible] hazards. The Farval Spray Valve Sys- [illegible] maintain a clean, even film of [illegible] shines are in operation.



Drawing shows component parts of the Farval Spray Valve Centralized System of Lubrication—manual pumping station, dual lubricant lines, compressed air line, single Spray Valve and nozzle. Both automatic and manual systems installed three years ago are in operation today, prolonging gear life, saving labor and lubricant.



Wire Rope at Work — This is the woodyard at Kraft Center, Cantonment, Fla., one of the largest enterprises of the St. Regis Paper Company. Here they build and move mountains — enormous mountains of logs. The stockpiles normally carry an inventory of 30,000 cords, and 1200 to 1400 cords are fed daily to the chippers at the paper mill.

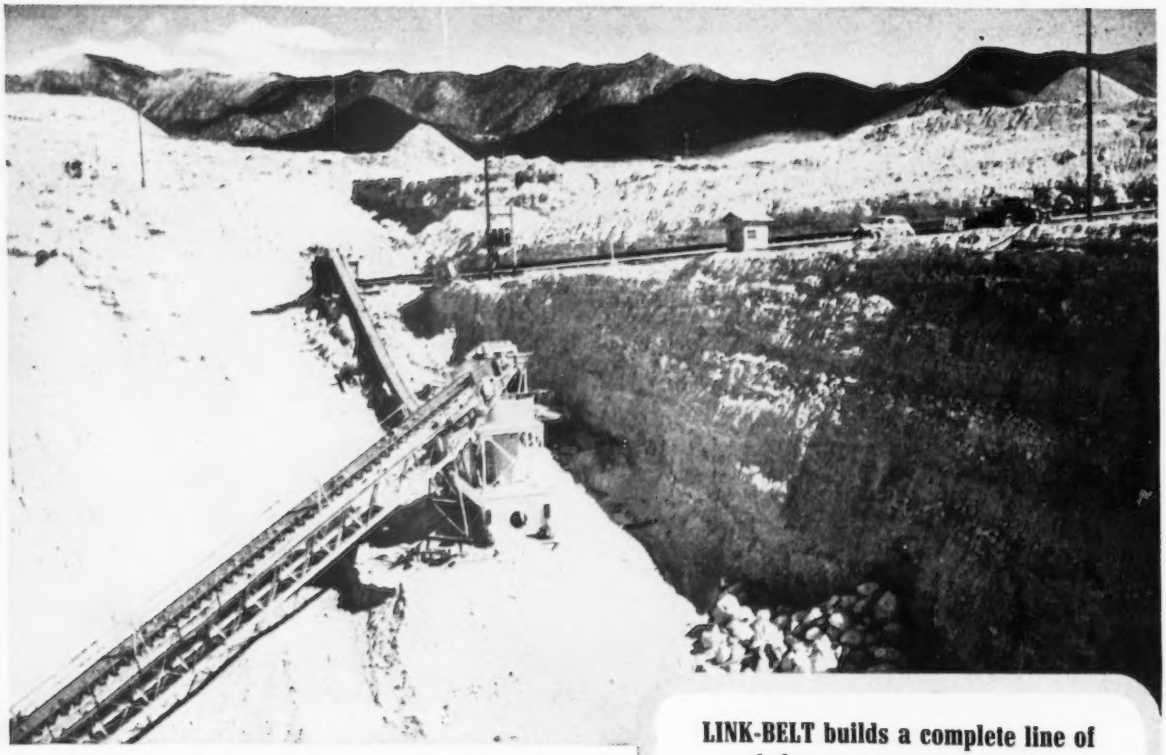
The cranes you see in the yard are moving vast quantities of pulpwood, building up reserves so that the mill, with its healthy appetite for logs, will never go hungry. This is a job, too, for Bethlehem Wire Rope, which is rigged on the hard-working cranes. It is a punishing chore by any standard, the kind entrusted to Bethlehem rope in virtually every type of industry, wherever there's lifting or hauling to be done.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

TOTAL ENGINEERING



Porphyry gold ore, crushed enroute, is elevated from pit floor to storage area by series of Link-Belt belt conveyors.

It's your assurance of top efficiency with LINK-BELT belt conveyors

HERE'S how "total engineering" works for you when you use Link-Belt Belt Conveyors. First, Link-Belt conveyor engineers analyze your needs—then recommend the *right* components. In addition, Link-Belt can supply all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers. And Link-Belt will build your supporting structures and enclosures . . . install the job completely, if desired. Call the Link-Belt office near you for any engineering assistance you need.

LINK-BELT

BELT CONVEYOR EQUIPMENT

13,280-D

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales offices in Principal Cities.

LINK-BELT builds a complete line of belt conveyor components

ALL TYPES OF ROLLER BEARING IDLERS

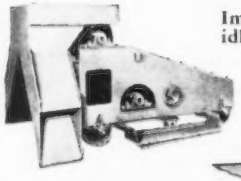
Return idler

20° troughed idler

Belt-training idler

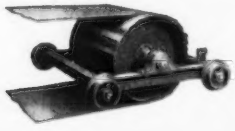
Rubber tread return idler

Impact-cushioning idler



BELT AND MOTOR PROPELLED TRIPPERS

COMPLETE TERMINAL MACHINERY



dynamic new engine gives the popular D Motor Grader increased work power

The thousands who own Allis-Chalmers Model D's know the ability of these versatile machines to do outstanding work on both construction and maintenance jobs. Now — with extra power and added features — the Model D sets even higher performance standards in the low-cost grader field.

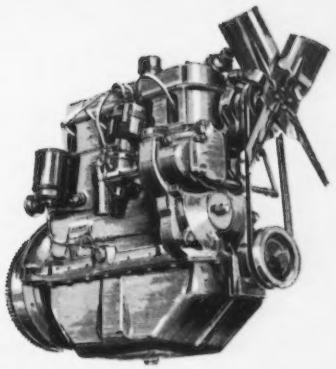
Dynamic New Power-Crater Engine gives the Model D reserve power to : (1) handle the same loads in higher gear or bigger loads in the same gear, (2) increase road speeds, especially where there are grades, (3) reduce need for shifting, thus lengthen clutch life, (4) give better all-round maneuverability. There's plenty of power to crowd while loading with the rear-end loader. Engine throttles down to half speed *and still does the same job* — on low-speed work.

Leaning front wheels* enable the Model D to handle new jobs . . . counteract side-draft on ditching and bank cutting.

Power circle turn* permits easy positioning of blade from operator's seat. When finishing subgrade or blacktop, for example, moldboard can be readily rotated without disturbing road surface.

These and other big-grader features — such as ground-gripping Tandem Drive, ROLL-AWAY Moldboard, Tubular Frame and Power Controls — combined with extra power make the Model D the accepted leader in the low-cost grader field. Ask your Allis-Chalmers dealer to demonstrate on your own job.

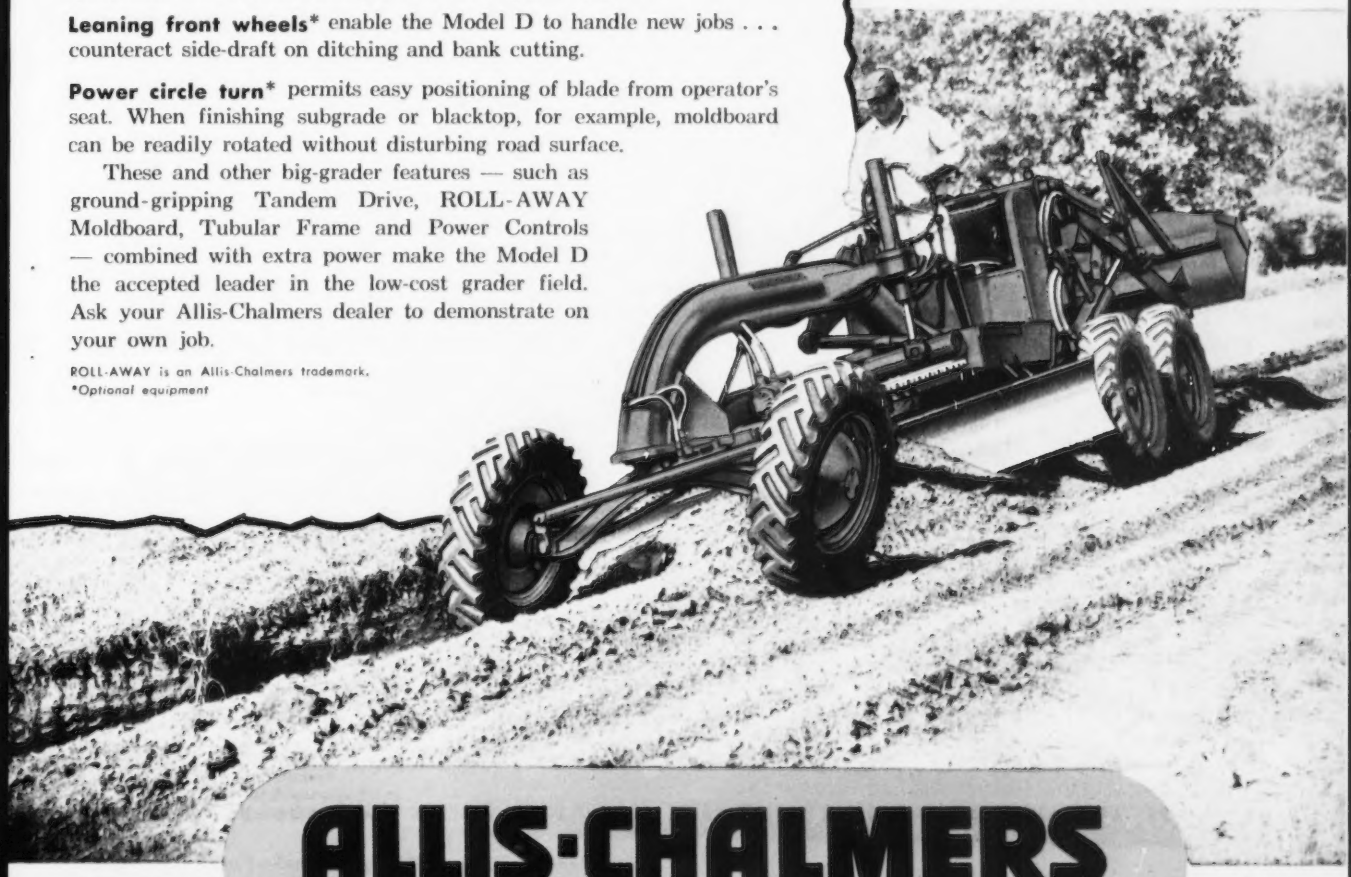
ROLL-AWAY is an Allis-Chalmers trademark.
*Optional equipment



POWER-CRATER Engine brings *truly modern power* to the Model D

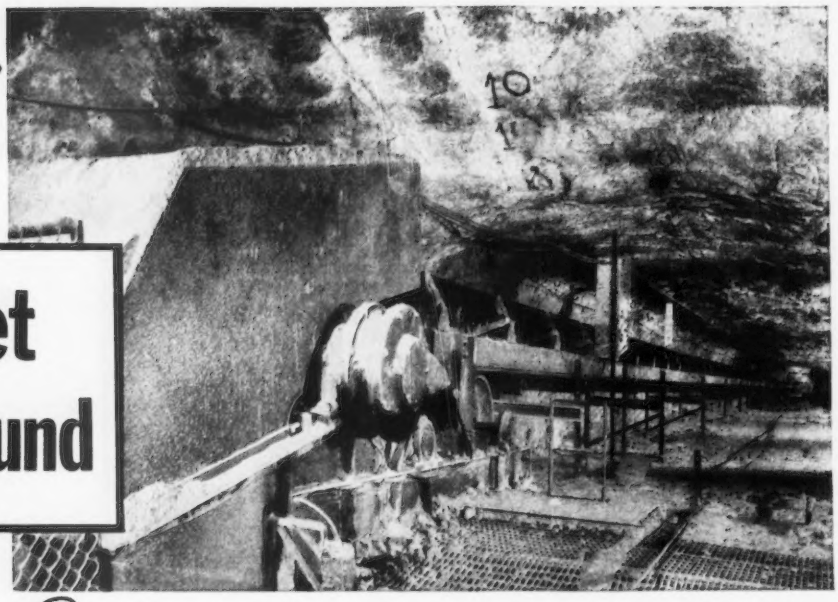
This new engine boosts power while using less fuel per horsepower. It obtains high-octane performance when using regular gasoline. Only by watching a new Model D work can you fully realize what this truly modern engine adds to its performance!

Weight: 8,800 lb. (bare) • Brake Horsepower: 50
4 Speeds forward to 25.6 mph.
Reverse Speed 3.3 mph.



ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

View down the conveyor, from head shaft to tail shaft. Ore "climbs" this slope 900 tons per hour.



900 Feet Underground

S-A CONVEYING Systems with

automatic "traffic control" handles high-volume **POTASH ORE . . .**

Around Carlsbad, N. M., is one of the largest potash deposits in the United States. This S-A equipped conveying system plays an important part in economical production. It receives ore from the mine car dumper, feeds it to the crusher, reclaims it and carries it at 400 tons-an-hour up a long slope conveyor for delivery to the surface by skip hoist. At every step an automatic control system—complete with indicator panels and safety devices—insures that no unit feeding to another can operate under load unless the unit ahead is running. Ore travels in a smooth, continuous flow, safeguarded against choke-ups or jamming.

Whatever *your* particular bulk materials handling needs, S-A engineers will cooperate in any way you like . . . they'll design the entire installation or plan with your own engineers. They work with a complete line of bulk handling equipment. Write and we'll arrange a meeting, without obligation to you.

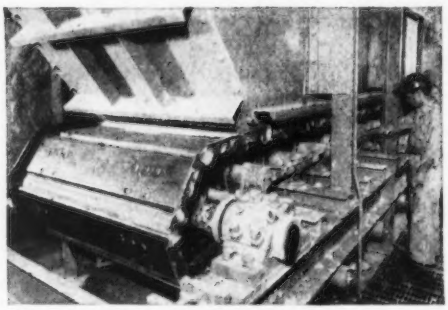
Belt Conveyors
Belt, Pan & Plate Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage & Reclaiming Systems
"Natural Frequency" Vibrating Conveyors
REDLER Elevator-Conveyors
ZIPPER Elevator-Conveyors
Conveyor Belt Cleaners
Headshaft Holdbacks
Grizzlies & Screens
Centrifugal Pilers
Bin Gates & Tunnel Gates
Car Pullers & Spotters
Bucket Elevators
Skip Hoists
SEALMASTER Ball Bearing Units

STEPHEN S-A ADAMSON MFG. CO.

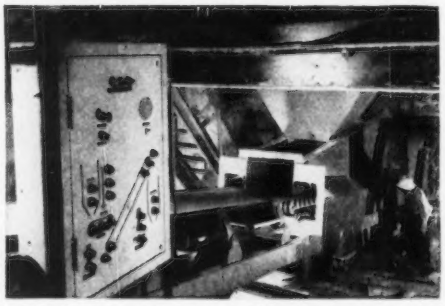
4 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

INTERNATIONAL MINERALS & CHEMICAL CORP.
Carlsbad, New Mexico

Mine cars in 20 to 30 car trains are individually dumped without uncoupling into a receiving hopper. Under the hopper, an S-A AMSCO Manganese Steel Feeder feeds the Sylvinite potash ore to a crusher that discharges minus 5" crushed ore to a storage stope. Under storage an air operated cut-off gate feeds the ore to another AMSCO feeder with a capacity of 400 TPH. Ore passes through a discharge spout to the 30° S-A Belt Slope Conveyor. It is carried more than 800 feet, with a 165' lift, at a rate of 350 FPM and 400 TPH and discharged into a large ore pocket, to be hoisted to the surface.



AMSCO secondary feeder that discharges to belt conveyor. An S-A Tellevel control automatically stops the feeder if there is a choke-up.

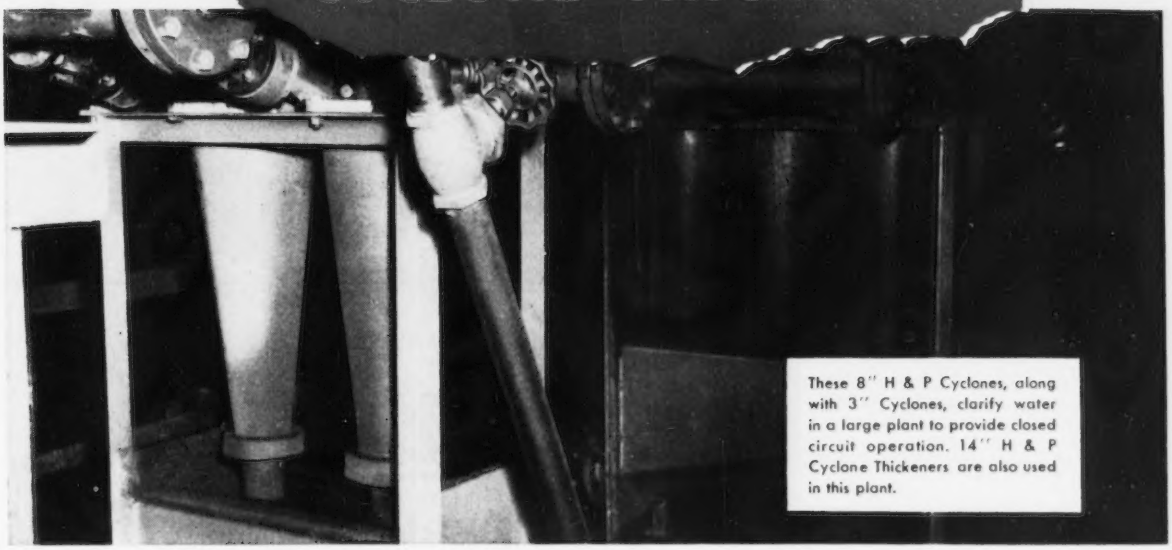


Tail shaft area of belt conveyor. This electric control panel flashes a complete operating picture of the entire system.

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

The Answer to your Problem may be a

Heyl & Patterson CYCLONE THICKENER



These 8" H & P Cyclones, along with 3" Cyclones, clarify water in a large plant to provide closed circuit operation. 14" H & P Cyclone Thickeners are also used in this plant.

Every day in the mining industry Heyl & Patterson Cyclone Thickeners recover valuable material from wasted sludge . . . provide closed circuit operations . . . and deslime ahead of froth flotation to increase the froth product. H & P Cyclones are now working in all types of thickening, classifying and clarifying operations.

In many installations this versatile equipment has recovered and saved enough material to pay for itself in *one month's time.*

Heyl & Patterson Cyclone Thickeners can furnish you the same efficient, low-cost solution to your processing problems.

When a desliming, classifying or clarifying problem confronts you, call on the vast experience and the research facilities of Heyl & Patterson.

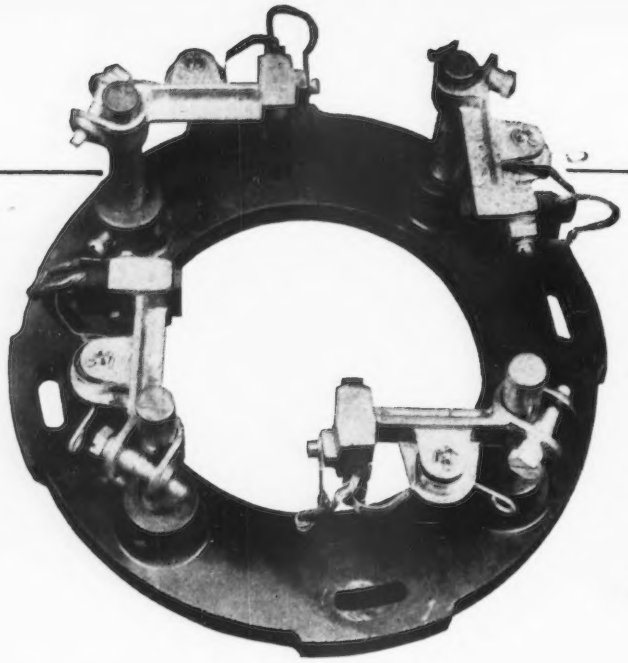
FOR MORE INFORMATION—WRITE FOR BOOKLET CT-31

Heyl & Patterson CYCLONE THICKENERS can help you obtain:

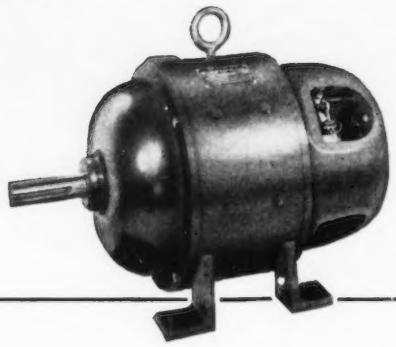
- **Recovery of Valuable Material from Wasted Slurry**
- **Closed Circuit Operation**
- **Sharper Classification**
- **Effective Desliming Before Froth Flotation.**
- **Thickening and Dewatering of Froth Product.**
- **Improved Filtration**
- **Low-cost Thickening, Classifying and Desliming**

Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reineveld Centrifugal Dryer
Thorsten Coal Sampling Systems
Rotary Mine Car Dumpers
Coal Crushers
Coal Preparation Plants
Bradford Breakers

Heyl & Patterson, Inc.
"SINCE 1887"
55 FORT PITT BLVD. PITTSBURGH 22, PA.



SK DEPENDABILITY



Arcs leave no tracks on this *MELAMINE* ring

When conducting dust collects across the surface of a rocker ring, it can cause a flashover. In the case of ordinary materials used for rings, this arc carbonizes a path into the ring itself. Thus, when the machine is cleaned to remove conductive particles, the path or track cannot be removed. High resistance grounds result. Motor efficiency is lost.

But, carbon flashovers don't have a chance on this Melamine ring. It's arc proof . . . noncarbonizing. There is no tracking effect . . . no "burned-in" paths to cause shorts. Thus, when you wipe the ring clean, it is restored to full service condition. Top motor efficiency is maintained.

That is one reason why the Life-Line SK offers users of d-c motors new dependability. Cast brass brushholders are another. They are noncorroding . . . have no bearings to wear or bind. No moving parts to get out of adjustment. A stainless steel spring maintains perfect brush contact through constant tension.

There are other reasons, too. Ask your Westinghouse representative to show you the inside story of the Life-Line SK motor. See the "Transvision" presentation. It takes the SK apart and puts it together again at your own desk. You'll see why something new has been added to SK dependability. Call your local representative today. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-21555-A

YOU CAN BE SURE...IF IT'S

Westinghouse

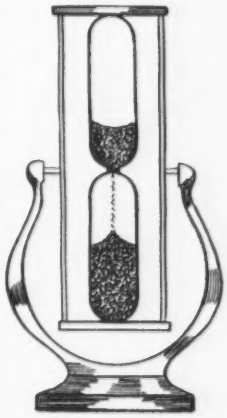
The Sands of Time

Were half of the ancient mariners' speedometer

When the Turks captured Constantinople, 500 years ago, and blocked the ancient caravan trail to the Orient, western traders had to seek another route—by water.

So, away sailed the admirals and captains, and Vasco Da Gamma found his way to India, Columbus found America, Drake rounded Cape Horn into the Pacific. Frobisher explored Hudson's Bay, Pizarro and Balboa penetrated Mexico. Never before had so many adventurers roved so far.

And how far did they rove? Well, that was a computing job for scientific equipment—a log-line with a knot tied in it every 47¼ feet (1/129th of a nautical mile), a sand-glass that emptied in 28 seconds (1/129th of an hour) and a sailor who could watch the sand-glass while he counted the knots running through his fingers as the log-line caught the pull of the ship's wake. Multiplying this count by 129 gave the number of "knots" that the ship was traveling in the hour. And this early speedometer would measure marine time and travel for another 300 years. At the drill rig, too, time and travel are important because they measure footage costs, and in reducing footage costs there's nothing so effective as Truco Diamond Bits. Their irresistible cutting power takes them through any formation swiftly, accurately, thriftily, dependably. They are used profitably in every phase of drilling. Consult your Truco Diamond Bit Catalog.



WHEEL TRUEING TOOL COMPANY
3200 W. Davison Avenue Detroit 6, Michigan

WHEEL TRUEING TOOL CO. OF CANADA, LTD.
575 Langlois Avenue Windsor, Ont., Canada

Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

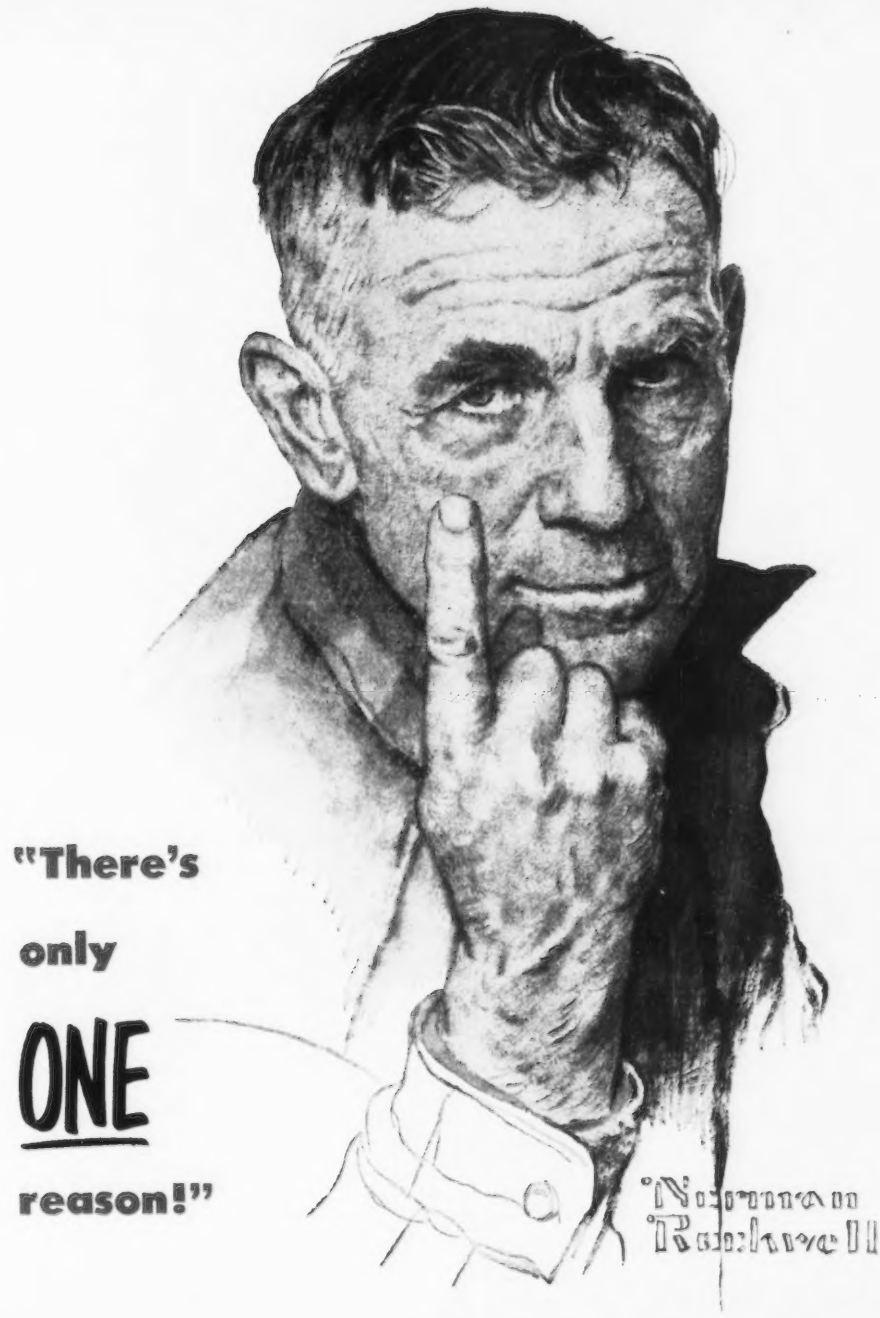
Fittings of steel, iron, and bronze are also manufactured in all conventional types and sizes.

WALWORTH

valves and fittings

60 East 42nd Street, New York 17, N. Y.

Distributors in principal centers throughout the world



IT'S JUST THAT SIMPLE. There's only one reason in the world why so many wire rope users in the mining field prefer Roebling wire rope... *it costs a lot less on the job than any other.*

For maximum wire rope efficiency and economy, call your nearest Roebling office for a Field Man. He'll recommend the best ropes for your requirements.

ROEBLING CF&I

A subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13228 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5240 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 331 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Increase Your Output up to 300%...

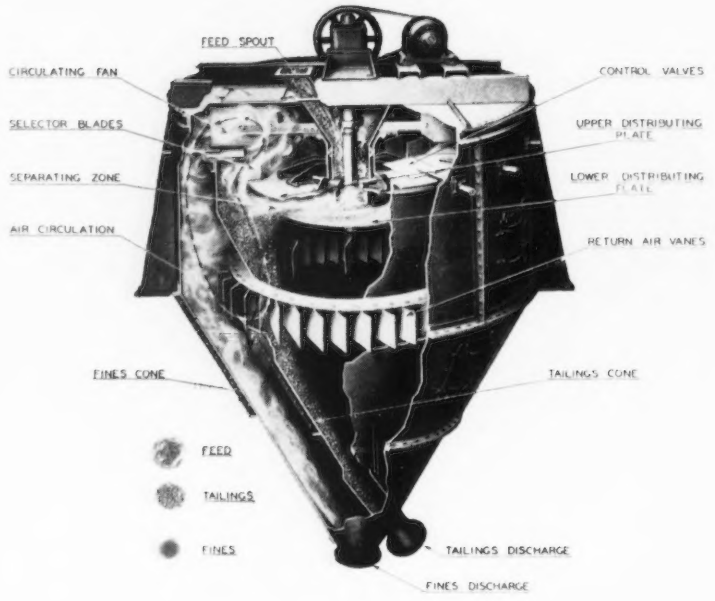
Get Accurate Fines with...

STURTEVANT

Whirlwind Centrifugal SEPARATORS

The Sturtevant Air Separator is one investment that pays off daily profits by increasing production and reducing costs. Its extremely efficient operation assures finer separation of fine material from coarse material with the result that uniform quality of product is always obtained.

They'll not only increase your output by as much as 300%, but provide 10 to 50% savings in power costs, too. They are available in sizes 3 to 16 feet in diameter with capacities from ¼ to 50 tons per hour with a fine-product range of 40 to 325 mesh or finer. Bulletin 087 gives the entire story. Write for your copy.

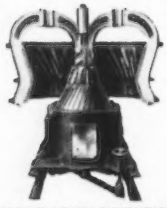


Other Sturtevant Equipment for Increasing Production and Cutting Costs

MICRONIZER® GRINDING MACHINE

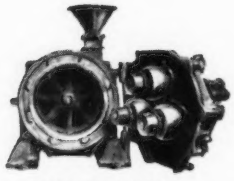
A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.

Sturtevant Micronizer grinding machines are available in many sizes and capacities.



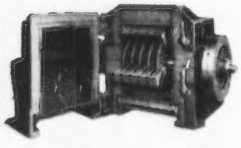
ROTARY FINE CRUSHERS

for intermediate and fine reduction (1" to ¼"). Open door accessibility. Soft or moderately hard materials. Efficient granulators. Excellent preliminary Crushers preceding Pulverizers.



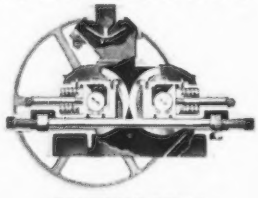
RING-ROLL MILLS

for medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



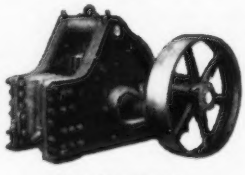
SWING-SLEDGE MILLS

for coarse and medium reduction (1" to 20 mesh). Open door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.



CRUSHING ROLLS

for granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8x5 to 38x20. The standard for abrasives.



JAW CRUSHERS

for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

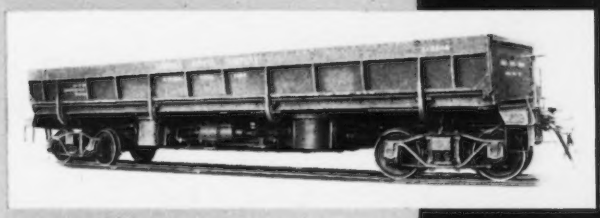
STURTEVANT MILL COMPANY

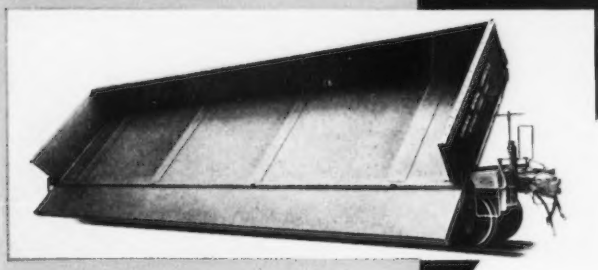
101 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

DESIGNERS & MANUFACTURERS OF CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS AND EXCAVATORS • ELEVATORS • MIXERS

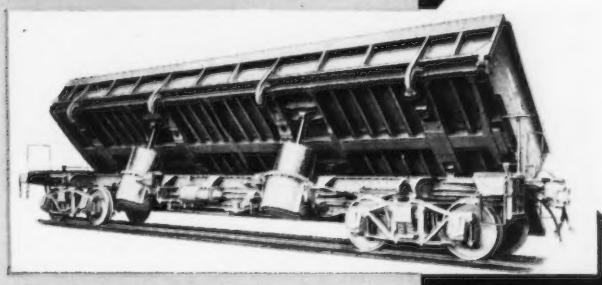
GREGG

World-Wide Service to the Mining Industry

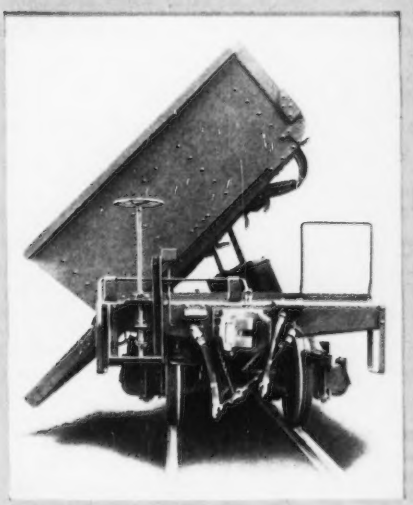




Manufacture of Railway Cars for Export Our Specialty.



HIGHEST QUALITY
RUGGED CONSTRUCTION
MODERN DESIGN
PROMPT DELIVERY



We design and build cars to meet customer's particular requirements, or to suit standard railway specifications of countries served.

THE GREGG COMPANY, LTD.

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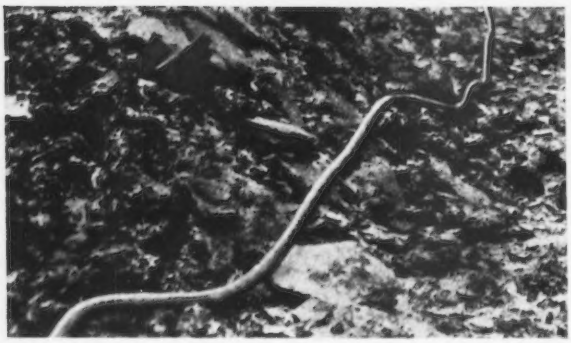
Cable Address: "GREGGCAR"



Over knife-edged rock... through water and ice...

G-E GEOPRENE portable cables keep equipment in operation

When you're trying to get out the maximum tonnage each hour, cables usually take a beating. General Electric Geoprene portable cable is built to withstand the punishment of sharp rocks and sharper ice, and to withstand dragging and crushing. It is built to keep your heavy portable equipment *in operation*.

This cable has a neoprene-base jacket that resists abrasion, oils, acids, alkalies, sunlight, and flame. A tough, corded, reinforcing mesh increases the cable's tensile strength, while the cable itself is constructed for maximum flexibility.

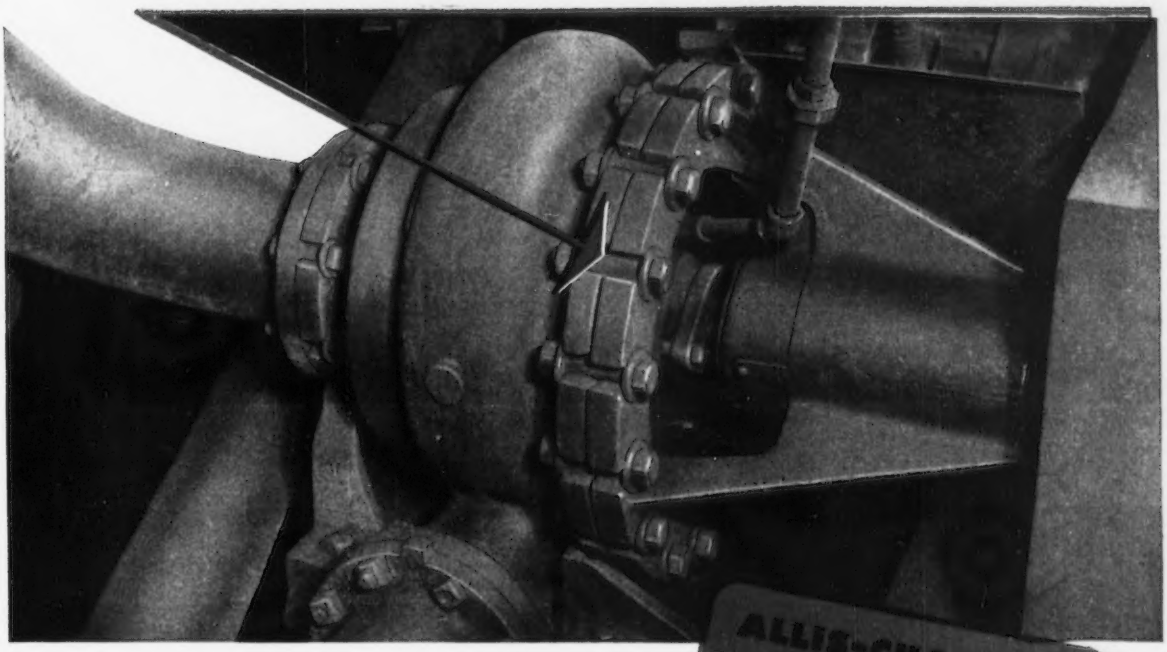
In the full line of General Electric wires and cable you will find cables designed to meet *your* service conditions for all mining applications. For more information, write for the booklet "General Electric Wire and Cable for the Mining Industry", Section W108-1195, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

POWER CABLE, AERIAL CABLE, PORTABLE CABLE, DRILL CORD, LOCOMOTIVE CABLE, CONTROL CABLE, SHOT FIRING CORD, TELEPHONE CABLE, BOREHOLE CABLE, MAGNET WIRE.

You can put your confidence in—

GENERAL ELECTRIC

Here's a Pump That Maintenance Men Like



ALLIS-CHALMERS
Solids Handling PUMP

- **All maintenance points are easy to reach**
- **Pump can be taken down and returned to service in less than a half hour**
- **Many parts are interchangeable between different pump sizes**

THE Allis-Chalmers solids handling pump is ruggedly built to stand rough solids handling service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers solids handling pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

Complete Pumping Unit Furnished . . . Allis-Chalmers can furnish the complete pumping unit — pump, motor, *Texrope* drive and control — assembled and ready to install and run. A *Vari-Pitch* V-belt drive makes it possible to vary head and capacity at the turn of a crank.

Get the Complete Story . . . Every Allis-Chalmers solids handling pump is application engineered by a specialist who knows solids handling equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee 1, Wisconsin and ask for Bulletin 52B6381.

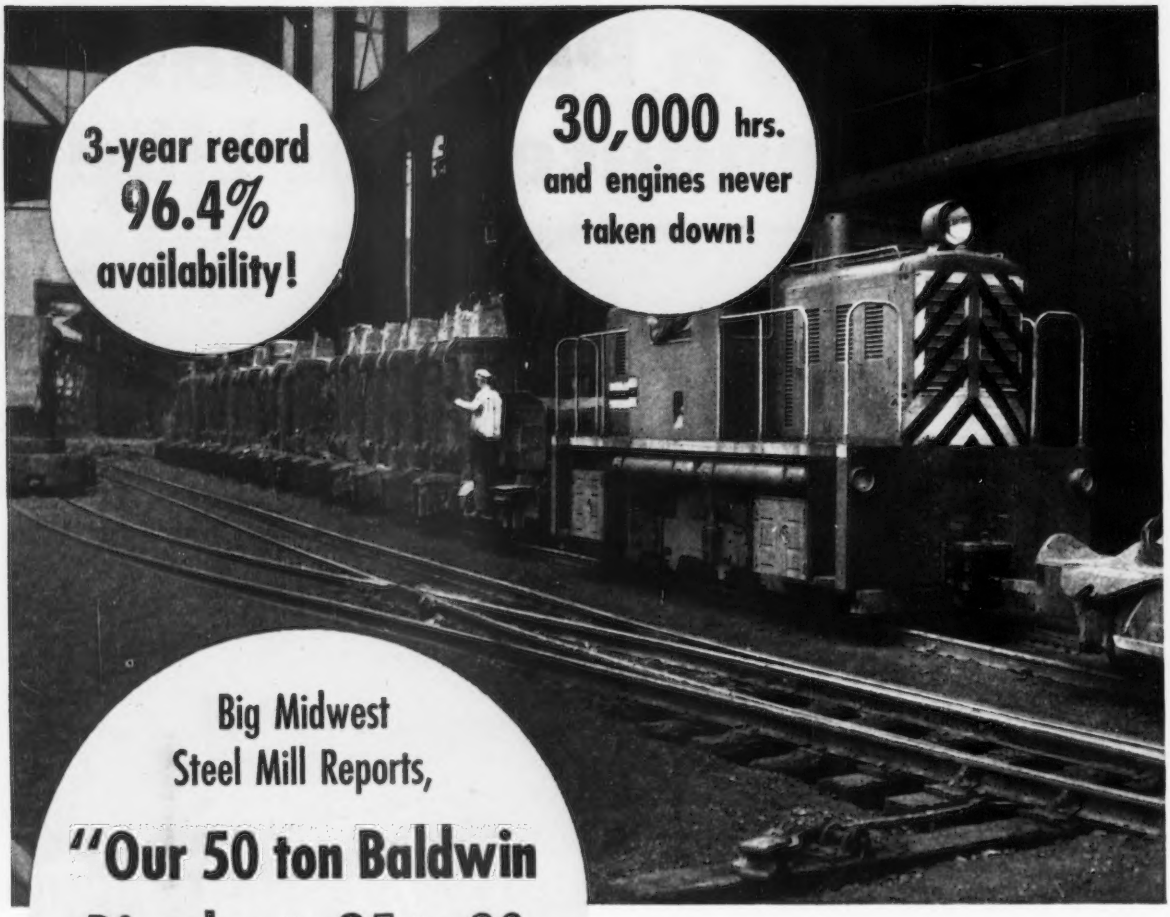
A-4137

NOW . . . even longer wear

Impeller and suction plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear, lower pumping costs.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

ALLIS-CHALMERS



Big Midwest Steel Mill Reports,

"Our 50 ton Baldwin Diesel gets 25 to 30 heats out on time every day!"

When it costs hundreds of dollars for every delay of a minute in getting a heat out and the ingots to the blooming mills and soaking pits, efficient, dependable locomotives are indispensable to a steel mill. A major steel mill in the midwest reports a remarkable record of money-saving performance by their Baldwin industrial diesel-electric locomotive:

"Our 50-ton Baldwin replaced two steam locomotives on the hot line moving ingots to the blooming mills and soaking pits. We tap 8 to 10 heats a shift, three shifts a day. The heats run as much as 150 tons, making many of the loads for the Baldwin 594 tons which theoretically would require a 32% heavier diesel. But this Baldwin has handled *every* job 24 hours a day for over 3 years in spite of the extreme heat, bad curves and rough track conditions on this run. It is taken off the job each week two hours for inspection and lubrication. No major repairs have been necessary during 30,000 hours of operation."

In mine or mill, you, too, can depend on similar economy and dependability by switching to and with Baldwin Industrial locomotives.

BALDWIN · BLH · LIMA-HAMILTON

BALDWIN - LIMA - HAMILTON

INDUSTRIAL LOCOMOTIVES

DENVER "SUB-A" FLOTATION

Complete Milling Equipment – from testing, to feeder, to dryer!

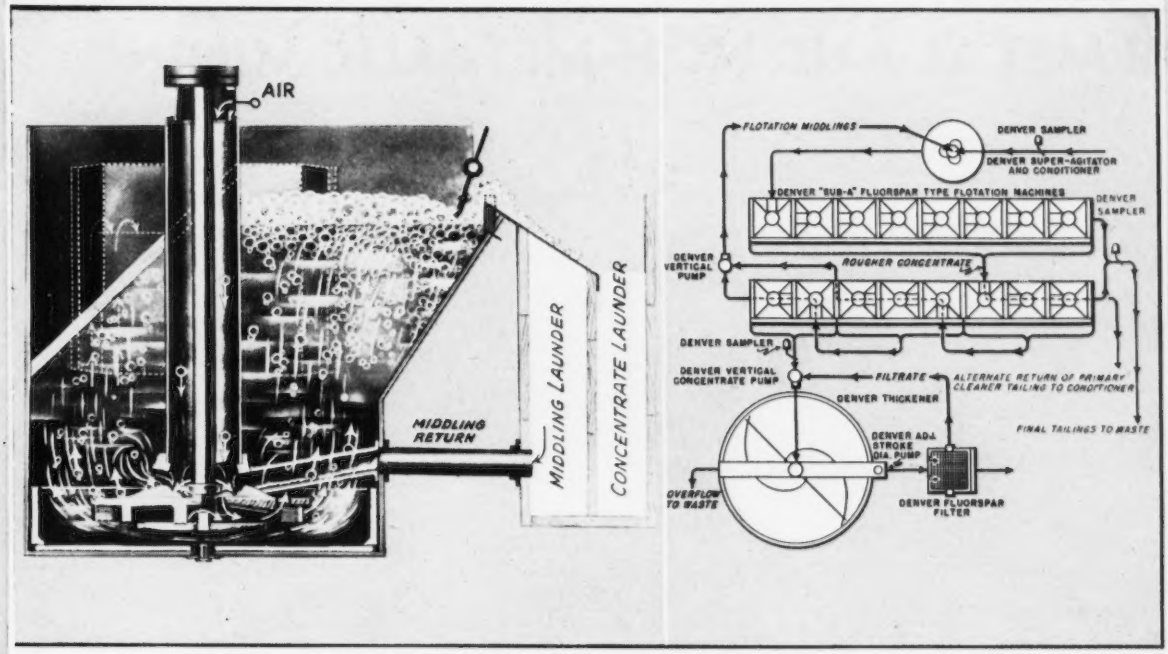


Photo at left shows cut-way view of Denver "Sub-A" Flotation Cell. Note how feed pipe enters at low level discharging on to impeller. Flowsheet at right illustrates flexibility in returning froth products for additional cleaning without use of pumps or step-downs. Note complete control of cleaner-cell tailings as they are recirculated.

Exclusive Principle of Denver "Sub-A" Flotation Permits Gravity Return of Middlings and Froth Without Pumps or Step-Downs

Clean, high grade concentrates and much lower costs are made possible by Denver "Sub-A" Flotation Machines. With cells all on one level, you can return concentrates to cleaner cells by **gravity flow,** and recirculate cleaner tailings. This completely eliminates expensive pumps and step-downs. Only Denver "Sub-A" Flotation offers these exclusive features. Positive recirculation — without "short circuiting" — gives you lower tailing and highest grade concentrates.

GRAVITY RETURN

The high original costs and maintenance of pumping or stepped down cells are unnecessary when you use Denver "Sub-A" Flotation. This is because the feed pipe is located near the bottom of each Cell—directly over the impeller. Since the location of this feed pipe is low, it is a simple matter to return middling froth by gravity down a launder into a cleaner cell six to eight cells away. The low level of the feed pipe also makes it possible to recirculate tailings from cell to cell— without pumps.

Thus, in Denver "Sub-A" Flotation Machines, cell-to-cell gravity flow and cell-to-cell middlings return is easy. You thereby eliminate pumps and step downs...and get better metallurgy...and have the flexibility you need to meet changing conditions.

HIGHER GRADE CONCENTRATES

Another important feature in all Denver "Sub-A" Machines which allows you to get higher values is the positive circulation feature. Positive circulation means that all material entering a Denver "Sub-A" Cell must enter through the feed pipe directly over the impeller. Thus any feed, middling return, froth return or coarse sand product gets maximum exposure to flotation treatment. As a result, Denver "Sub-A" Flotation gives you lower tailings and higher grade concentrate.

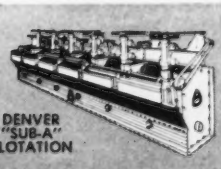
Write or wire—find out about the many other advantages of Denver "Sub-A" Flotation which help you get greatest profits with lowest costs.

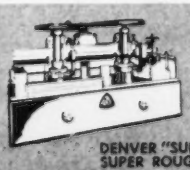
Free Technical Bulletin Sent on Request

Over 25 years of Flotation Engineering

DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH ST. DENVER 17, COLORADO


DENVER "SUB-A" FLOTATION


DENVER "SUB-A" SUPER ROUGHER FLOTATION MACHINE

DENVER SUPER AGITATOR AND CONDITIONER

DENVER "SUB-A" UNIT CELL

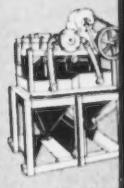
DENVER DIAPHRAGM PUMPS

DENVER DILLON SCREEN

DENVER DISC FILTER

DENVER JAW CRUSHER

DENVER STEEL HEAD BALL MILL


DENVER MINERAL JIG

DENVER VERTICAL PUMP

DENVER SRL PUMP

DENVER AUTOMATIC SAMPLER

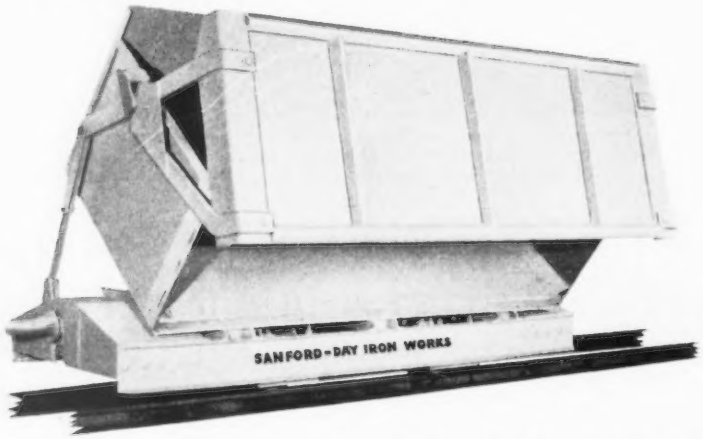
DENVER STEEL HEA ROD MILL

DENVER ORE FEEDER

NEW MINE CARS BUILT BY SANFORD-DAY FOR METAL AND NON-METALLIC MINING

This is one of the S-D Automatic Drop Bottom Cars to be installed by Certain-Teed Products Corp. for hauling gypsum. Extra heavy steel plates were used in the construction of this car to absorb shock loads. It is another Sanford-Day development toward extending the life of cars in tough service, to increase haulage efficiency and reduce maintenance costs.

In many mines the Granby Side Dump Car is the required method of haulage. Here is a Sanford-Day built Granby Car, designed for practical construction, with re-inforcing angles and extra supporting members where needed to increase the life and service of the car. This car was built for the LePanto Consolidated Mining Co., Philippine Islands.



Regardless of Your Car Requirement, We Build it!

We show you these two Sanford-Day Mine Cars, just recently completed, because they are examples of Sanford-Day's experience and know-how in practical car design and dependable construction. These cars will also give you an idea of why so many metal and non-metallic mine operators are turning to Sanford-Day for their mine car requirements.

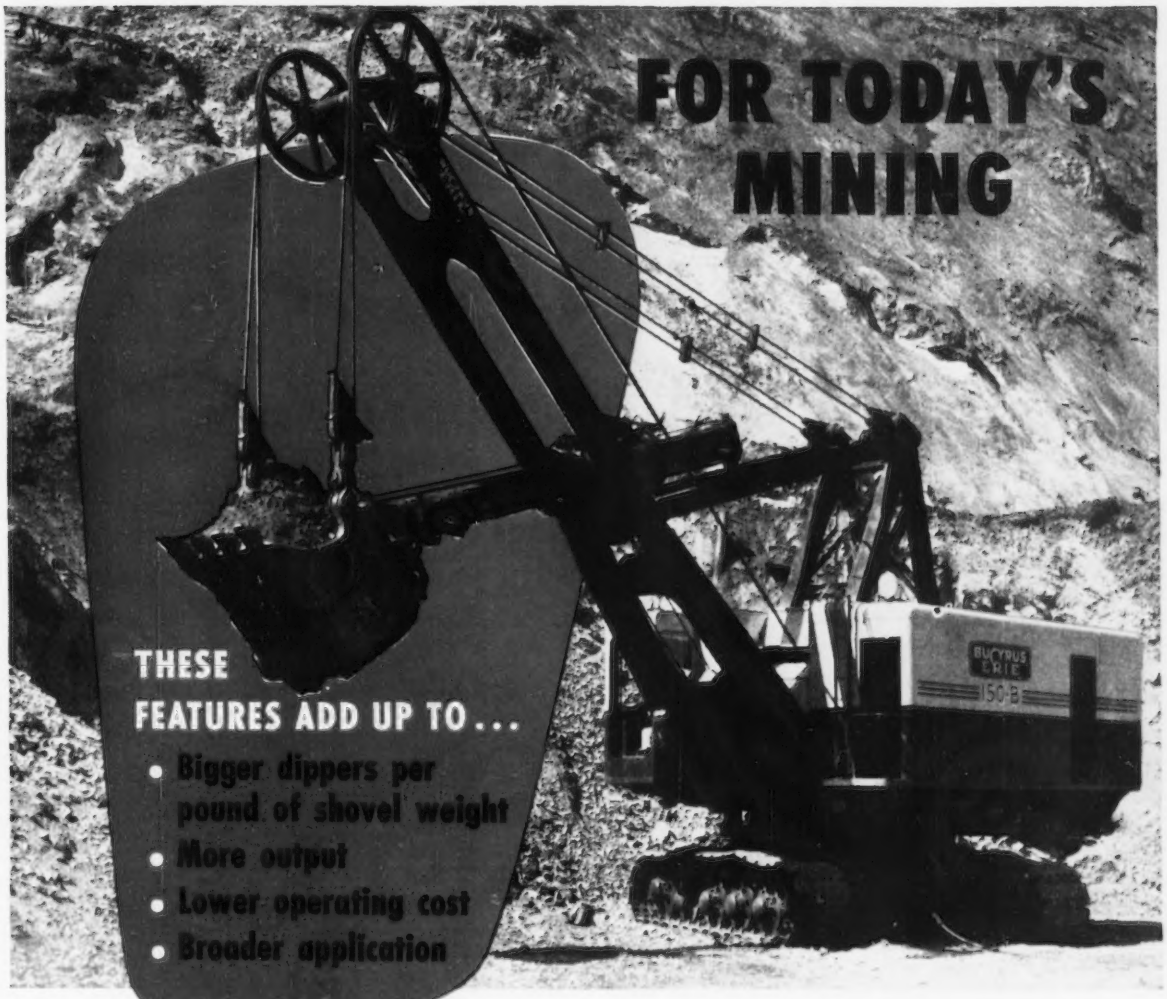
These operators, like yourself, are cost-minded! They know that skimpy fabrication is false economy. Consequently, they are installing Sanford-Day Cars because of their superior construction . . . extra welding . . . extra rivets and extra reinforcing where extra strength should be—cars designed and built up to service requirements for longer life and less maintenance.

Regardless of the type car you need, we build it . . . and you'll discover that an investment in Sanford-Day built cars will be money well spent.

SANFORD-DAY IRON WORKS

KNOXVILLE
TENNESSEE

Tomorrow's Shovels



Bucyrus-Erie's progressive design brings the modern shovel front end to the mining industry.

Only Bucyrus-Erie offers these features in front end equipment on mining shovels.

BOOM — Two section — light upper section, rugged lower section. No excess weight. Weight and strength concentrated where needed and close to center of rotation.

Lower boom section part of main machine, through twin strut connections to A-frame. Boom feet wide spread — no sway braces or cables. No boom jacking.

TYPE OF HOIST — Twin dual, single-part ropes, one attached to each side of dipper. Power automatically concentrated where needed on dipper lip to break through bank obstructions. No dipper bail.

SADDLE BLOCK — Cylindrical. Rubber cushioned against impact during fast plugging of swing. No binding with flexed dipper handles.

HANDLE — Single, tubular, one-piece, can rotate in saddle block. No handle twist possible.

CROWD MACHINERY — Located on revolving frame, close to center of rotation. Position reduces swing inertia. Accessible, protected.

TYPE OF CROWD — Quiet, positive, independent twin rope crowd and retract. Adapts itself to tubular handle rotation — low friction — less crowd power required.

CONVERTIBILITY — Shovels fully convertible to draglines of the independent motor type — no operating clutches or brakes.

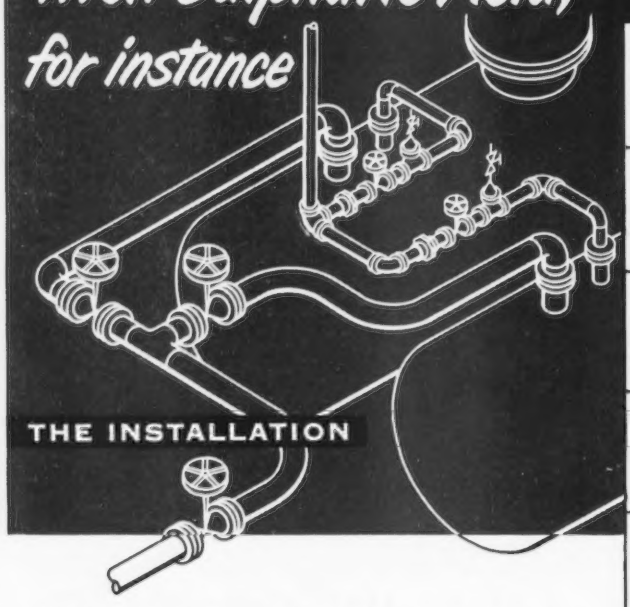
There are many more reasons why these modern Bucyrus-Eries are the finest quarry and mine excavators ever built. Get the full story today. 43L53C

BUCYRUS ERIE

South Milwaukee
Wisconsin

Model Behavior for Steel Valves

...on Sulphuric Acid, for instance



THE INSTALLATION

At a leading Gulf Coast lube oil plant, using Crane steel valves on lines to concentrated sulphuric acid storage and blow cases.

VALVE SERVICE RATINGS

SUITABILITY:
Giving full satisfaction

FEATURES:
Compact bolted-bonnet design

MAINTENANCE COST:
Routine service only needed

SERVICE LIFE:
In lines more than 2 years

OPERATING RESULTS:
Safe control of acid—no loss

AVAILABILITY:
Catalog item—No. 3607X

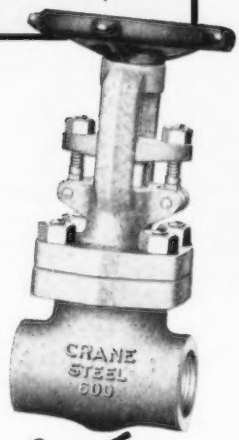
THE CASE HISTORY

Valves formerly used in this service showed severe corrosion a few months after installation. Both stems and seats were affected, with early leakage resulting. Longest life of any of these valves was less than one year.

Replacement was made more than 2 years ago with Crane No. 3607X steel gate valves. By effectively sealing against atmospheric condensation, the deeper Crane stuffing box prevented dilution of acid and resultant stem corrosion. Wider seating surfaces give Crane valves higher resistance to seat corrosion and leakage. They're still in service; show no loss of efficiency. That's the result of thrifty buying—when quality is the first consideration.

THE VALVE

You'll find big valve features in these Crane 600-pound bolted bonnet, small steel gates. They fill every need for quality, compact design, maximum strength with no excess weight. Easy to use; easy to service. Sizes, ½ to 2 in.; screwed, flanged, or socket-welding ends. See your Crane catalog or your Crane Representative.

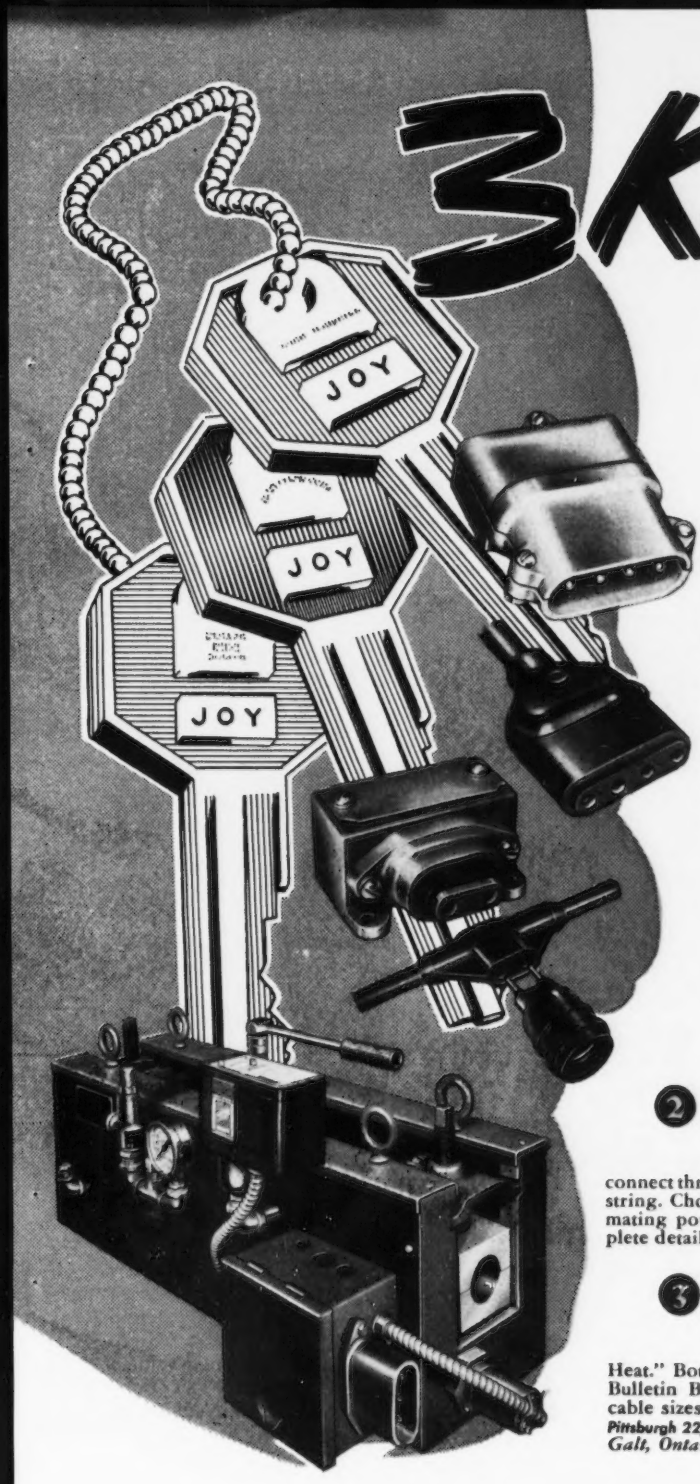


THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



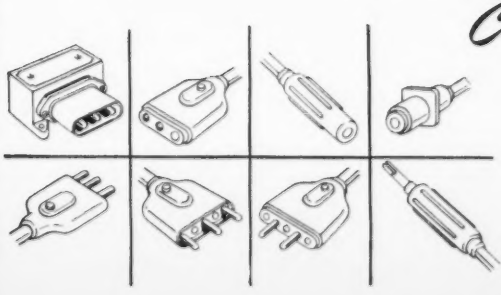
3 KEYS TO INCREASED MINING PRODUCTION

Dependable performance, safe operation and a minimum of maintenance attention, all are important keys to continuous high level production . . . and all are reasons why so many JOY electrical plugs, portable lighting lines and cable vulcanizers are being used in metal mining operations, today! Built to exceed the industry's highest standards for quality and durability, and backed by over a quarter century of intimate experience with its needs, these JOY products can be relied on to contribute their share to increased production.

1. ELECTRICAL PLUGS AND RECEPTACLES —More JOY electrical connectors are used in mining operations than all other brands combined. Vulcanized to cord or cable as one-piece Neoprene jacketed units, they can't crack or lose shape when struck hard blows . . . are moisture and dust tight . . . and require no pampering to provide a long life of safe, efficient service. Hundreds of styles and sizes are available for mining needs. *So for production's sake,* remember JOY when you need electrical connectors . . . and in the meantime ask for your copy of Bulletin MC-109.

2. PORTABLE LIGHTING LINES (String-a-lite)—No special tools or talents are needed to hook it up or take it down. Can be quickly lengthened, shortened or moved to meet the exact needs of any working or passage area. Supplied in one-piece factory molded sections of 2 to 10 light outlets that interconnect through JOY male and female "end-plugs" to make-up the complete string. Choice of five socket and two end plug designs. Several styles of mating power receptacles also available. Bulletin SL-202 provides complete details.

3. CABLE VULCANIZERS . . . for rubber, Neoprene, Buna S and thermo plastic jacketed cables—Simple in operation, JOY Vulcanizers quickly pay for themselves by making it possible to repair cuts and breaks in vital portable power lines immediately. Two models are available—"Steam" and "Direct Heat." Both are heated electrically with automatic temperature controls. Bulletin B-48 describes these vulcanizers in detail and lists molds vs. cable sizes. Write for your copy NOW. **Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

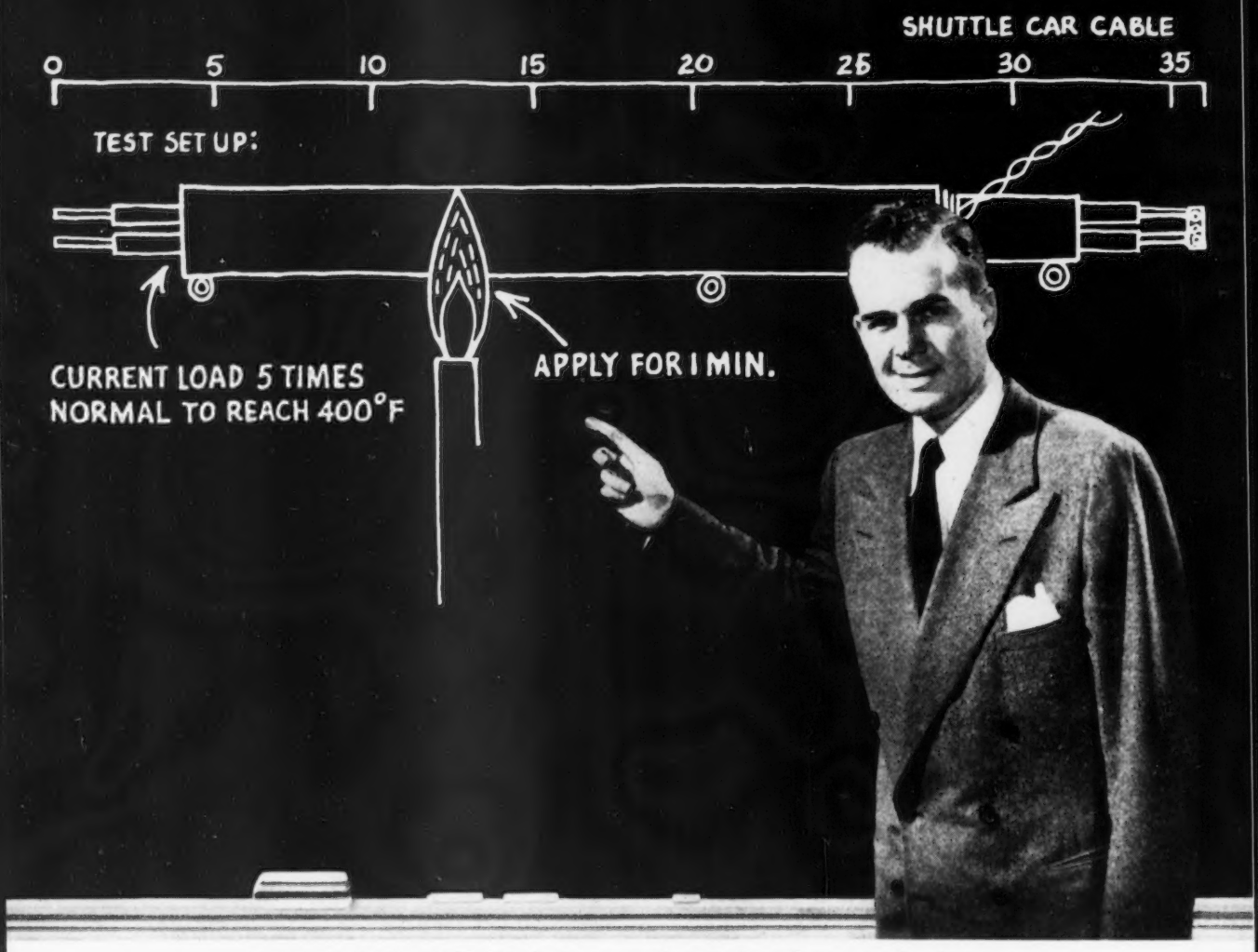


Consult a Joy Engineer

JOY

Specialists in Creating Electrical Connectors for Mining Applications, Since 1928

W&D ME 4859



APPROVED USBM TEST: Cable fails if it burns more than 6 inches or flames more than 3 minutes.

NO ANACONDA CABLE EVER FAILED THIS TEST

The U.S. Bureau of Mines flame-test for trailing cables is tough. But ANACONDA Cables have passed every time...*with ease*. That's not all! Performance-wise, a recent survey of shuttle cars in 15 mines found ANACONDA Cables last up to 300% longer than cables used only a few years ago.

NEW FEATURES GIVE CABLE STAMINA

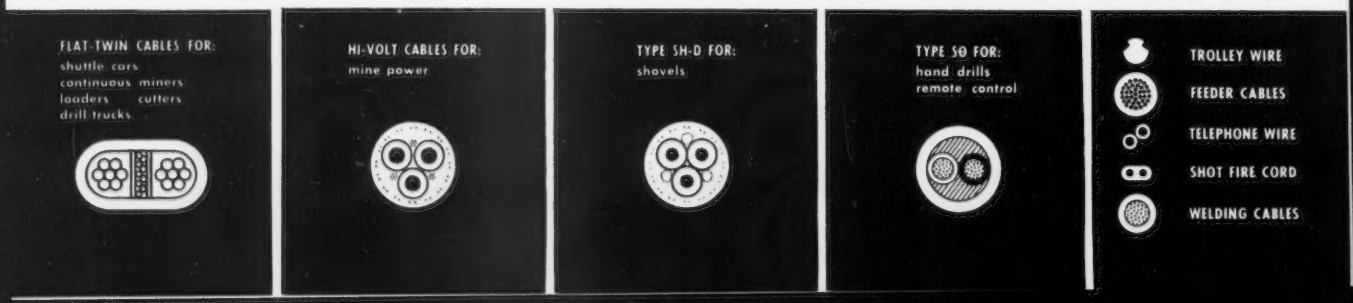
These facts are as good a certificate of quality as any we know. As new features have been added to ANACONDA Shuttle Car Cables, each has been repeatedly tested on special, scientifically designed equipment. A new improved neoprene jacket is tougher, more flame-resistant. You'll find more strength and heat-resistance in the new cold-rubber insulation. The cable has also been stranded in a new and decidedly better way. No wonder it can take more abuse from overloads, compression-cutting, sliver-cuts in wet mines, rib-pinching, runovers and dragging. Patented breaker strip* and balanced tensile strength of ground and power conductors make it safer to use.

A CLOSE LOOK AT CABLE COSTS

Examine this cable yourself. Ask your Anaconda Sales Office or Distributor for a sample. Test it . . . tear it apart. Then look at the cost of *one* shutdown on any working face of your mine caused by *one* break in cheap cable. It far exceeds any possible saving from buying cable on price. Your own production figures soon prove the value of quality cable. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.* *U. S. Patent No. 2,455,773

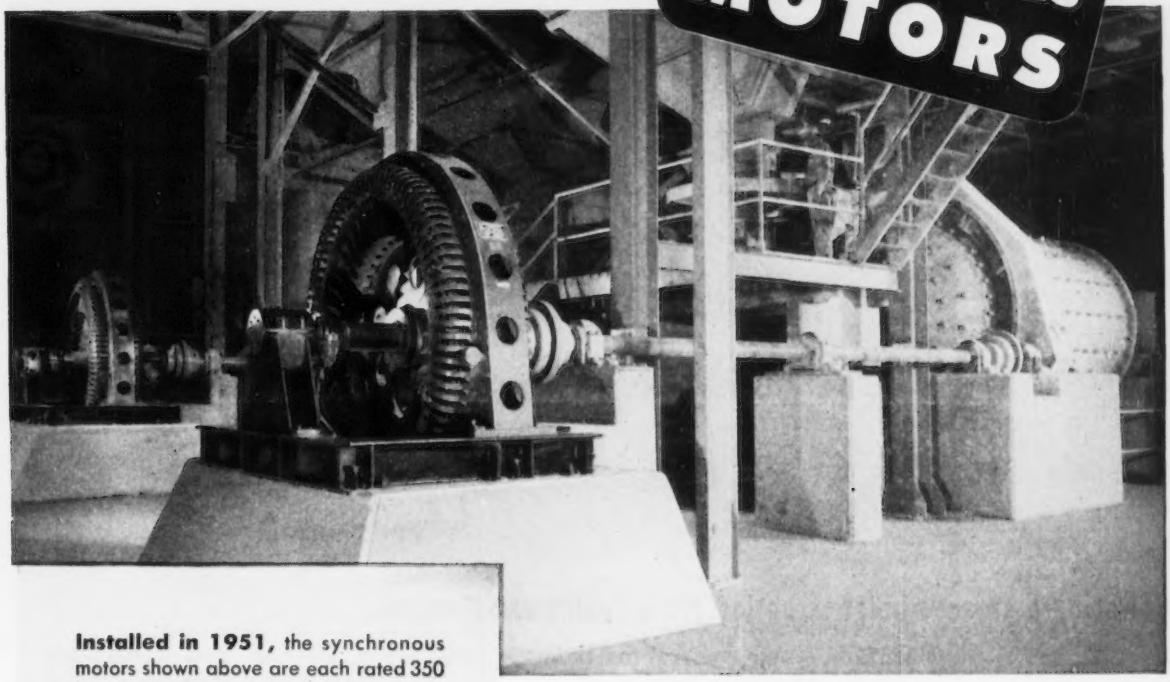
ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE



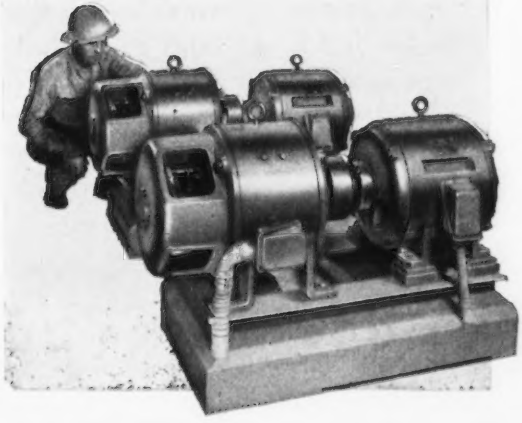
Built for a Long Grind

ALLIS-CHALMERS
Synchronous MOTORS



Installed in 1951, the synchronous motors shown above are each rated 350 hp, 80% pf, 440 volts, 180 rpm.

The 8 by 12-ft ball mills were furnished by Allis-Chalmers, along with the 15-kw m-g sets (shown below) which supply the excitation for the grinding mill motors.



Here are three reasons why Allis-Chalmers grinding mill motors help keep your mills grinding economically year after year:

Each motor is engineered for its job. A-C's half century of experience building electrical equipment *and* processing machinery assures torque and other operating characteristics tailored to the individual installation requirements.

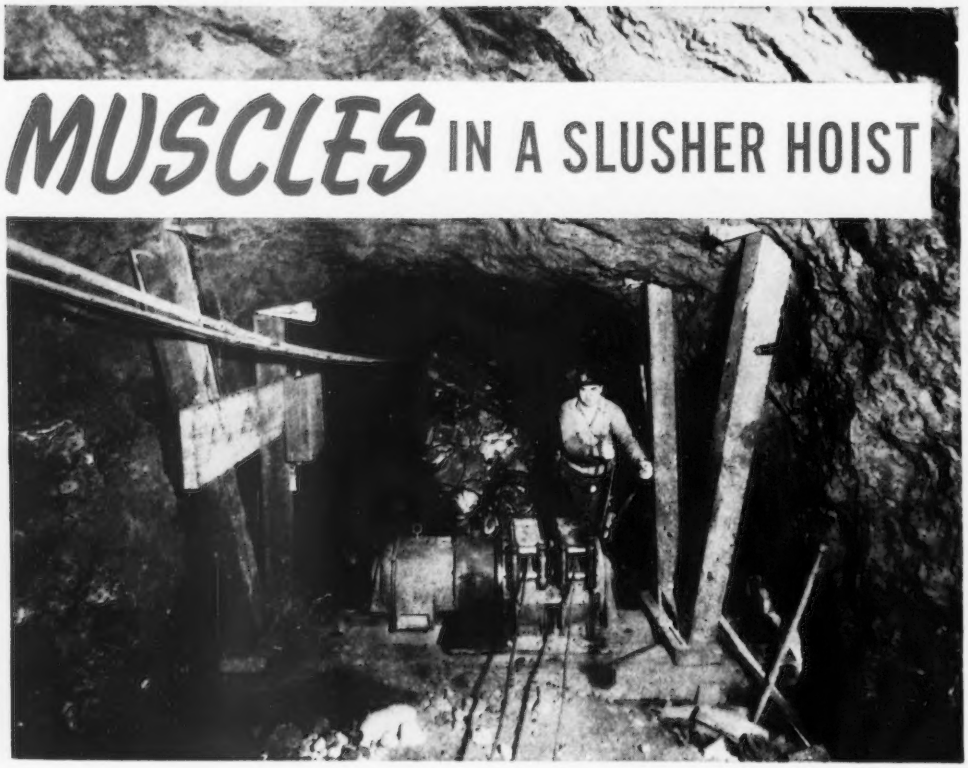
Time-proved basic design features contribute to long life and trouble-free operation. These are described in detail in Bulletin 05B7648.

Adequate manufacturing, inspection and testing facilities insure that each motor will be built exactly as specified.

For more information on motors that minimize maintenance and down time, call in your A-C representative, or write for illustrated Bulletin 05B7648. Allis-Chalmers, Milwaukee 1, Wisconsin. A-4150

ALLIS-CHALMERS

PUTTING *MUSCLES* IN A SLUSHER HOIST



Powering a slusher hoist is no job for a "pantywaist" cable.

Rockfalls, water, general mechanical and electrical abuse are normal events in the life of these cables. That's why you will find so many smart operators using Simplex-TIREX portable cables to bring dependable power to their slusher hoist. Simplex-TIREX Cables will operate dependably, even under the most adverse conditions, and they will do it for a surprisingly long time.

All Simplex-TIREX Cables are protected by a special cured-in-lead neoprene armor. This cured-in-lead process assures a smooth and tough outer jacket. The cable will not catch on obstructions. Thus it is easy to pull into place.

Simplex-TIREX Cables are no newcomer to the mining fields. They were developed for this service. They were the first cable to have a hard service rubber jacket. All other rubber-jacketed cables came after TIREX was developed. If you want dependable ore moving done, equip your slusher hoist with Simplex-TIREX Cable.

Simplex WIRES & CABLES

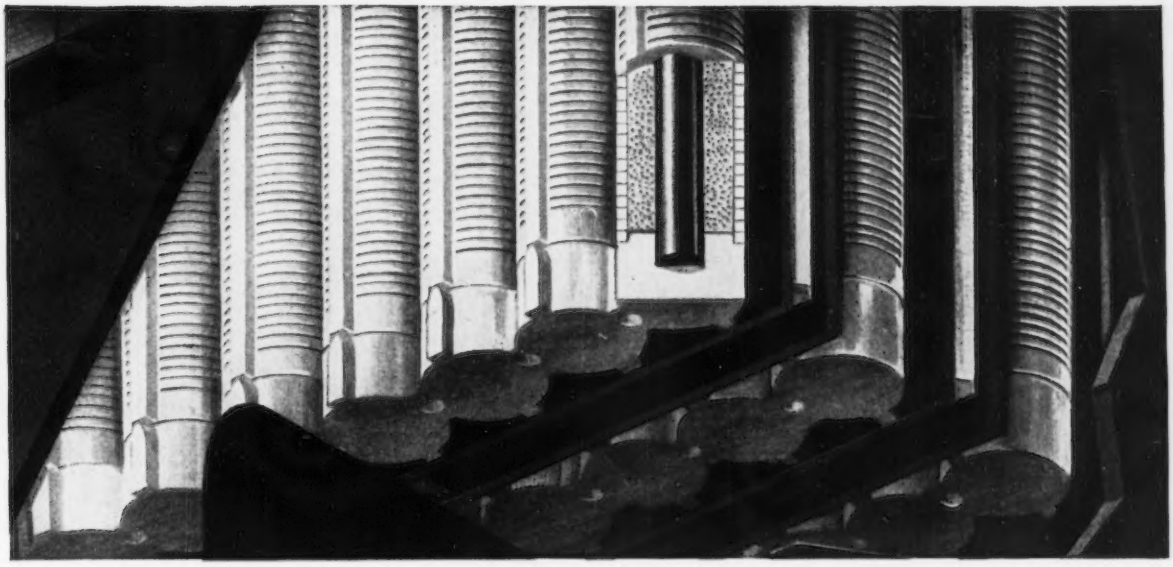
TIREX CORDS AND CABLES *are made only by the*

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Massachusetts

For Mine haulage . . . Exide-Ironclad now offers

★ 20% more capacity in the same space

★ Lowest cost per A.H. to own and operate



This cutaway picture shows the inside of the new T H EXIDE-IRONCLAD Battery.

Its larger positive plates, containing corrosion-resistant Silvium, are different . . . unique . . . exclusive! No other type of positive plate construction offers you the advantages of the T H Exide-Ironclad, with its slotted plastic tubes, permanently sealed on the bottom with polyethylene tube sealer. More active material is exposed to the electrolyte, resulting in greater power. More active material is retained, providing higher battery capacity for a longer working life. Other features include improved negative plates . . . practically indestructible Pormax separators . . . new sealing compound . . . shockproof molded jar . . . unbreakable quarter-turn vent plugs of plastic . . . corrosion-resistant tray coating.

All of the features of the new T H Exide-Ironclad Battery construction provide direct operating-hour savings for you.

Now-more than ever before...
YOUR BEST POWER BUY AT ANY PRICE!

1888... DEPENDABLE BATTERIES FOR 65 YEARS...1953

The new T H Exide-Ironclad BATTERY

Thrifty Hauler

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 2 • *Exide Batteries of Canada, Limited, Toronto*
"EXIDE", "EXIDE-IRONCLAD", "SILVIUM", "PORMAX", *Reg. T. M. U.S. Pat. Off.*

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol Multi-Service Oils

UNITS Compressors 14×12 — 14×12 — 14×14 / 9×12 — 7½×12 — 10×14

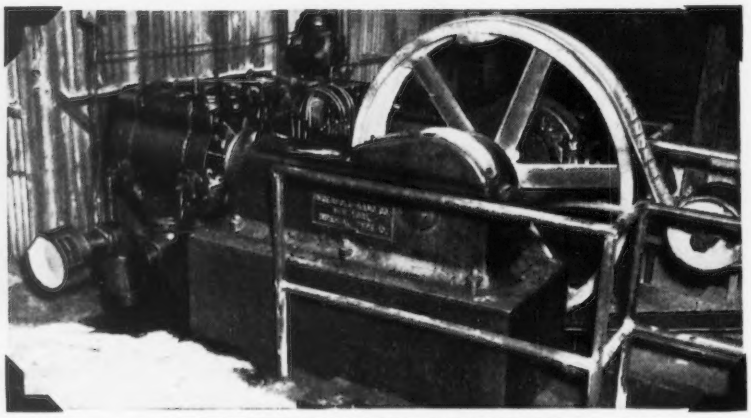
LUBRICATOR Force feed and crankcase

CONDITIONS Extreme dust conditions

PERIOD 7 years

FIRM U. S. Lime Products Corp., Sonora, Calif.

Lime mine compressor rings still good after 7 years!



LUBRICATED WITH CALOL MULTI-SERVICE OIL 55X, this is one of three Ingersoll-Rand compressors that supply all air for the Sonora, Calif., mine of the U.S. Lime Products Corp. Heavy coating of lime dust on the air intake and floor indicates the extreme conditions under which the compressor works. Even so, when pistons were pulled for the first time after seven years, rings were found to have no deposits, ports and grooves were free and clean—and the entire assembly was returned to operation.

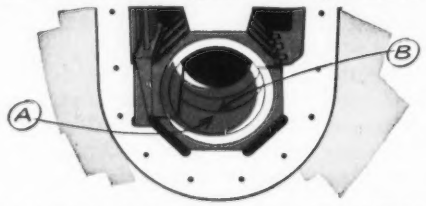
THESE VALVES, taken from the compressor's low side, get the first dust from the air intake. Note how they are free from all deposits.

FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, will be sent you on request to Standard Oil Company of California, 225 Bush St., San Francisco, Calif.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

Now CALOL Multi-Service Oil cuts costs in all types of compressors



In crankcase and on cylinders, Calol Multi-Service Oil reduces wear and oil consumption —has cut consumption 20% in air compressors.

A. Oxidation-resistant compounds prevent formation of varnish. Detergent keeps contaminants suspended in oil, prevents foam.

B. Special compound assures "hot-spot" lubrication...covers surfaces rapidly.

Calol Multi-Service Oils also recommended for pumps, diesel engines, enclosed gears.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

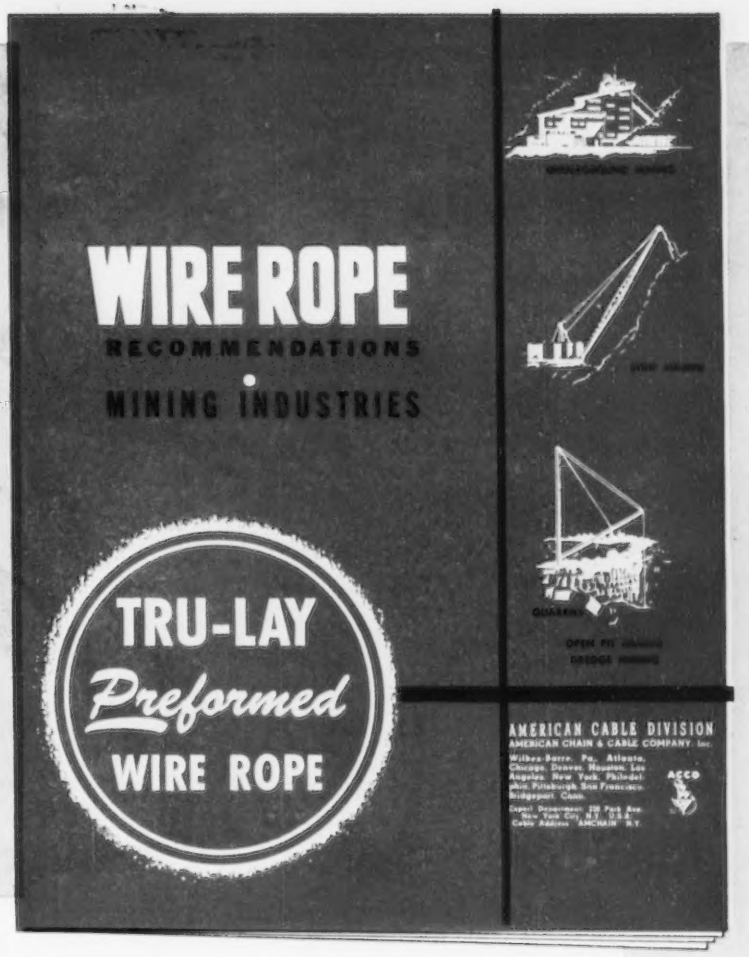
STANDARD OIL COMPANY OF CALIFORNIA
225 Bush Street • San Francisco 20, California

THE CALIFORNIA COMPANY
P. O. Box 780 • Denver 1, Colorado

STANDARD OIL COMPANY OF TEXAS
P. O. Box 862 • El Paso, Texas

an ACCO product

Here's a **NEW** Booklet that takes guesswork out of the selection of Mining Ropes



● With AMERICAN CABLE'S new wire rope recommendation booklet you see illustrations of various types of mining equipment. Then you look across the page at the listings, and there you find a complete description of the rope you need. Pages are 8½" x 11", the type is large and easy to read.

Here is the best wire rope recommendation book ever made for mining equipment. The recommendations are up-to-date and based on the successful use of TRU-LAY Preformed and other American Cable wire ropes over a long period of time.

Get a copy from your American Cable distributor or use coupon today.

ACCO

TRADE MARK

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

American Cable Division EMJ-3
American Chain & Cable
Wilkes-Barre, Pa.

Please send DH-128-A "Wire Rope Recommendations for Mining Industries."

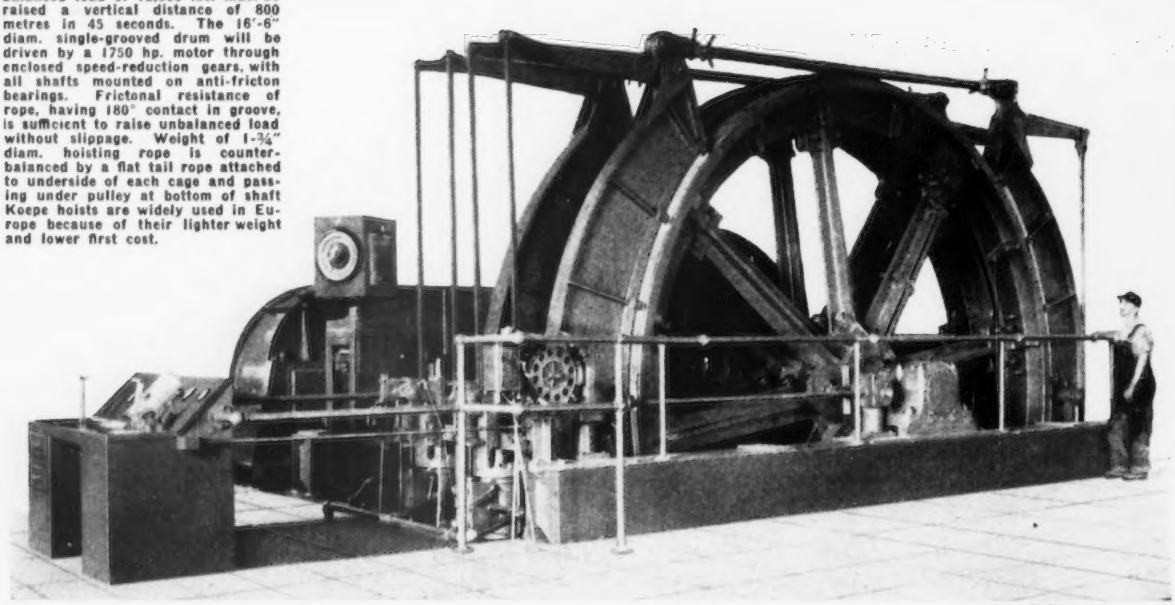
NAME_____

TITLE_____

ADDRESS_____

TOWN_____ STATE_____

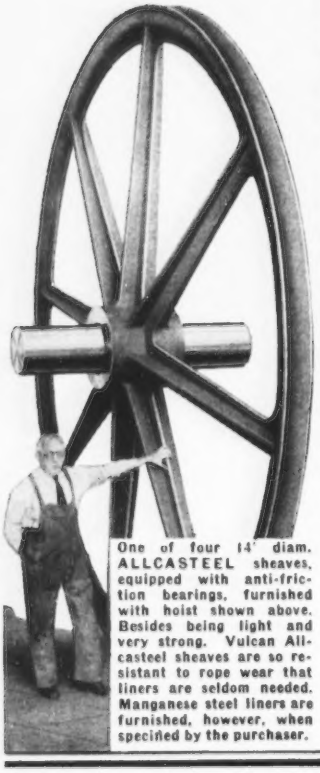
"Koepe" hoist recently designed and built for high-speed balanced hoisting in a European coal mine. Unbalanced load of 12,580 lbs. must be raised a vertical distance of 800 metres in 45 seconds. The 16'-6" diam. single-grooved drum will be driven by a 1750 hp. motor through enclosed speed-reduction gears, with all shafts mounted on anti-friction bearings. Frictional resistance of rope, having 180° contact in groove, is sufficient to raise unbalanced load without slippage. Weight of 1-3/4" diam. hoisting rope is counterbalanced by a flat tail rope attached to underside of each cage and passing under pulley at bottom of shaft Koepe hoists are widely used in Europe because of their lighter weight and lower first cost.



HEAVY-DUTY HOISTING EQUIPMENT

Designed and Built

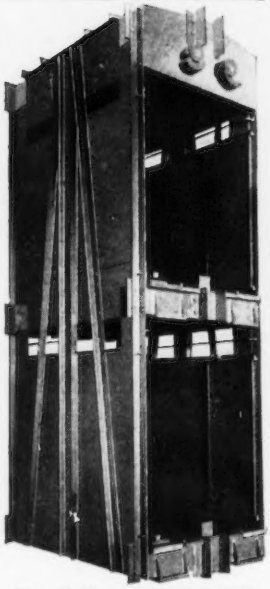
To Meet ANY Specified Requirement



One of four 14' diam. ALLCASTEEL sheaves, equipped with anti-friction bearings, furnished with hoist shown above. Besides being light and very strong, Vulcan Allcasteel sheaves are so resistant to rope wear that liners are seldom needed. Manganese steel liners are furnished, however, when specified by the purchaser.

During more than a hundred years of continuous operation, the Vulcan Iron Works of Wilkes-Barre has designed and built so many different types of heavy-duty hoists that our engineers now meet practically any requirement with a background of experience along comparable lines that assures better results and quicker delivery than would otherwise be possible. • Unusually complete manufacturing facilities, developed especially for this type of work, permit maintaining the highest possible standards of quality at competitive prices.

Correspondence is invited regarding any present or prospective requirement for modern hoists, sheaves, cages, skips, or other hoisting equipment. Illustrated bulletins, containing detailed information mailed promptly on request.



One of four double-deck cages furnished with hoist shown above. Each deck carries two mine cars. Heavy construction throughout, with extra-heavy thimbles, chains and safety devices, assures long service life with minimum maintenance expense.

Vulcan Iron Works

ESTABLISHED 1849

Cable Address "Vulworks, Wilkes-Barre"

WILKES-BARRE, PA.

New York City Office, 50 Church Street

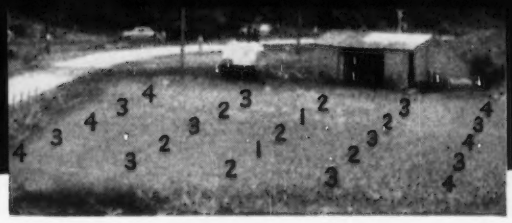
DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, CAGES, SKIPS, SHEAVES, ETC., CONVEYORS, ROTARY KILNS, DRYERS, ETC., AND ALL TYPES OF MINING LOCOMOTIVES

SEE OUR FOUR-PAGE INSERT IN THE McGRAW-HILL MINING CATALOGUES.

the inside story

Here's how ROCKMASTER® increases displacement

Final muck pile as seen from the road.



When the contractor or stripping operator says he wants a blast to produce increased displacement he means, "Well broken rock, piled up for easy digging" . . . the way it is in the large photo above. In this tight shot the rock was not thrown high, but it was thoroughly broken and dislocated from its original position.

The height of the final pile shows the increased displacement you can get with ROCKMASTER millisecond delays in an alternate pattern. When the blast is shot the first delays thoroughly stress the burden. Then at the instant of maximum stress, the next delays hit the burden with a churning action that twists and turns the rock. Without this double punch, the rock would tend to drop back into place. This would mean hard, expensive digging at the bottom of the pile even though the top rock might look well broken.

To see how you can profit by using the correct number of the sixteen ROCKMASTER millisecond delay electric blasting caps teamed with the ROCKMASTER system of explosives choice and loading methods, write for your copy of the 20-page ROCKMASTER booklet and a reprint of the paper "OVERBURDEN BLASTING TECHNIQUES."

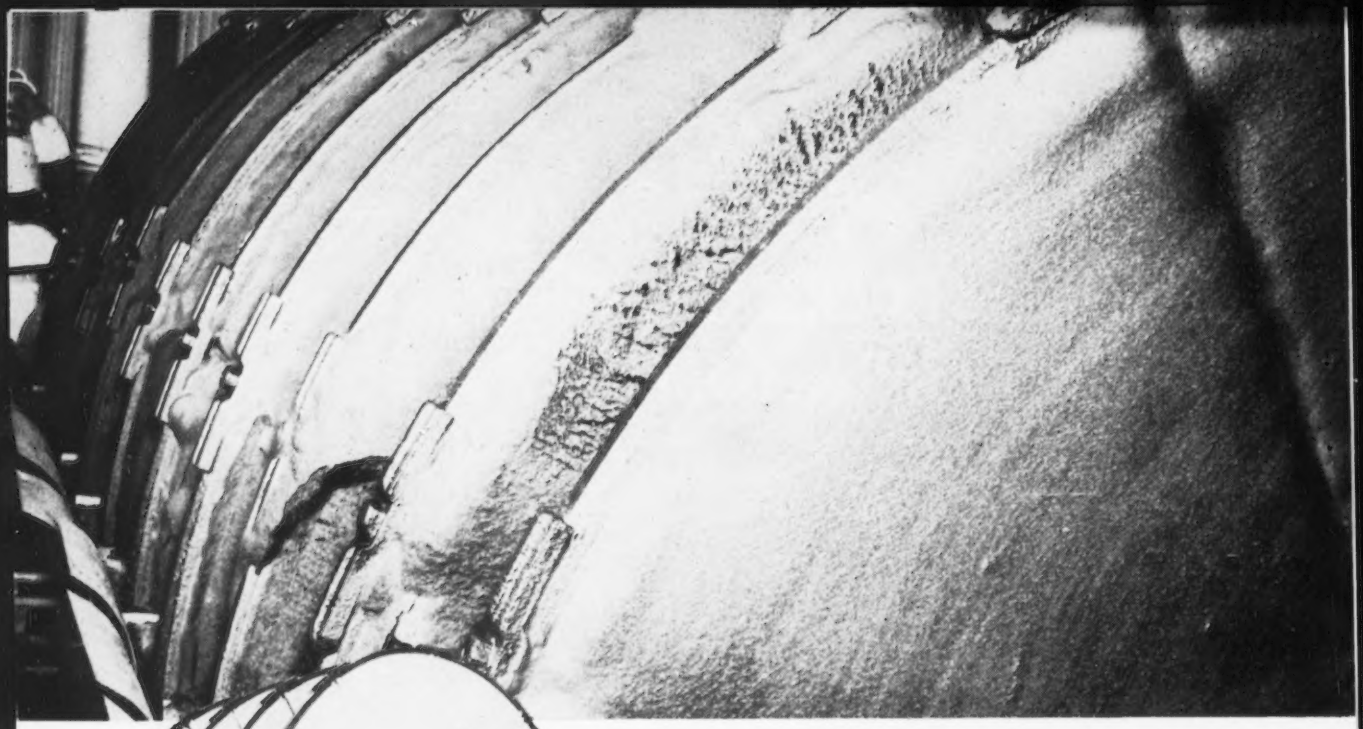
ATLAS

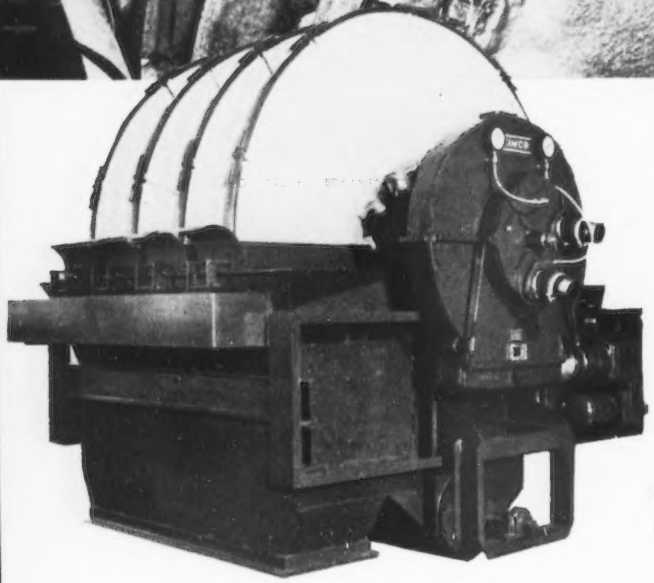
ATLAS EXPLOSIVES

"Everything for Blasting"

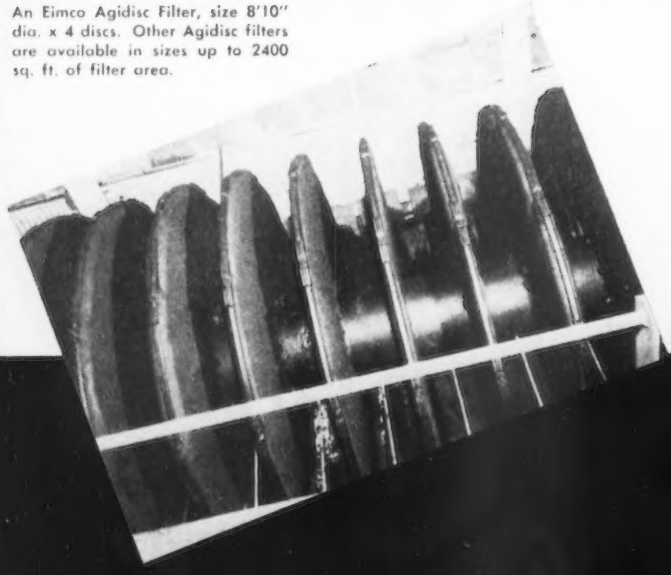
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities





An Eimco Agidisc Filter, size 8'10" dia. x 4 discs. Other Agidisc filters are available in sizes up to 2400 sq. ft. of filter area.



Eimco Agidisc Filters for Metallurgical Plants

Step up production in the mill by using more effective Eimco Agidisc filters in the dewatering of metallurgical slurries.

Eimco filters are carefully designed, heavy-duty production filters. In actual operation these units will produce more cake with lower moisture content than any other filter on the market of their type and size. Eimco Agidisc filters will also reduce your filter bag costs.

Here are some typical comparative results—In one plant an Eimco Agidisc filter was installed next to an ordinary disc filter, both operating at the same time on the same feed. The concentrate dewatered on the Agidisc contained 1½%-2% less moisture and tonnage dewatered on the Eimco Agidisc was 20% greater than on the ordinary disc filter.

EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

EXECUTIVE OFFICES AND FACTORIES – SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

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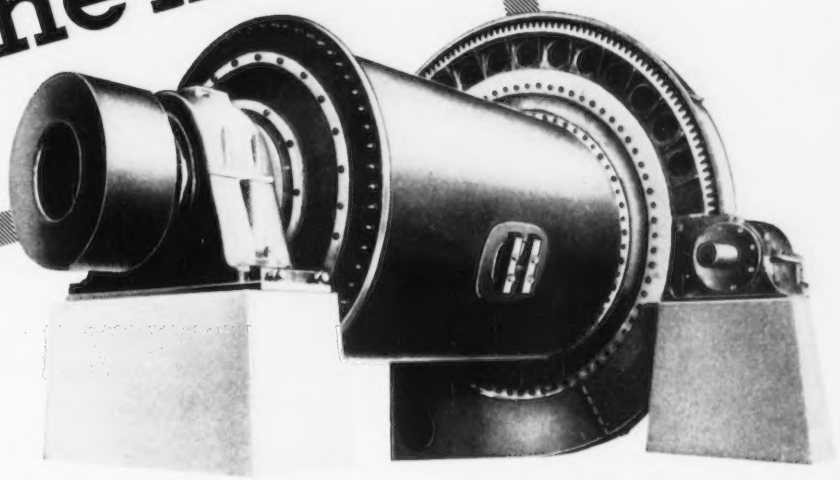
EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIF., 637 CEDAR STREET
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
IN ITALY: EIMCO ITALIA, S.P.A., MILAN, ITALY

GRINDING MILLS "traylored" to the trade

. . . produce "Custom Made" products . . . and profits



TRAYLOR GRINDING MILLS are engineered to exacting specifications developed from two important sources . . . data furnished by you, the customer, and the knowledge of Traylor engineers gained from half-a-century of experience.

Traylor driving gears are steel . . . precision cut with high and low addendum on our **MAAG** gear generator. Precision workmanship, combined with pressure lubricated main bearings plus trunnions cast integral with detachable heads result in more efficient, smooth working mills that reduce maintenance costs and cut down-time loss. All Traylor Grinding Mills are completely erected before being shipped to insure easy, trouble free installation on arrival.

The application of Traylor experience to your specific requirements makes a "Traylor-Made" mill the logical choice for you.

Traylor

GRINDING MILLS

TRAYLOR ENGINEERING & MANUFACTURING CO.
1552 MILL ST., ALLENTOWN, PA.

Free Bulletin: Mail this coupon today for your copy of Traylor's Bulletin 6121 which gives full details on Traylor Grinding Mills.

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Position: _____

Company: _____

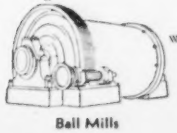
Address: _____ *State:* _____

Sales Offices: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

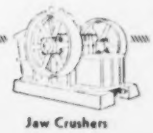
Primary Gyratory Crushers

Rotary Kilns

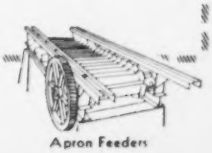
Secondary Gyratory Crushers



Ball Mills



Jaw Crushers



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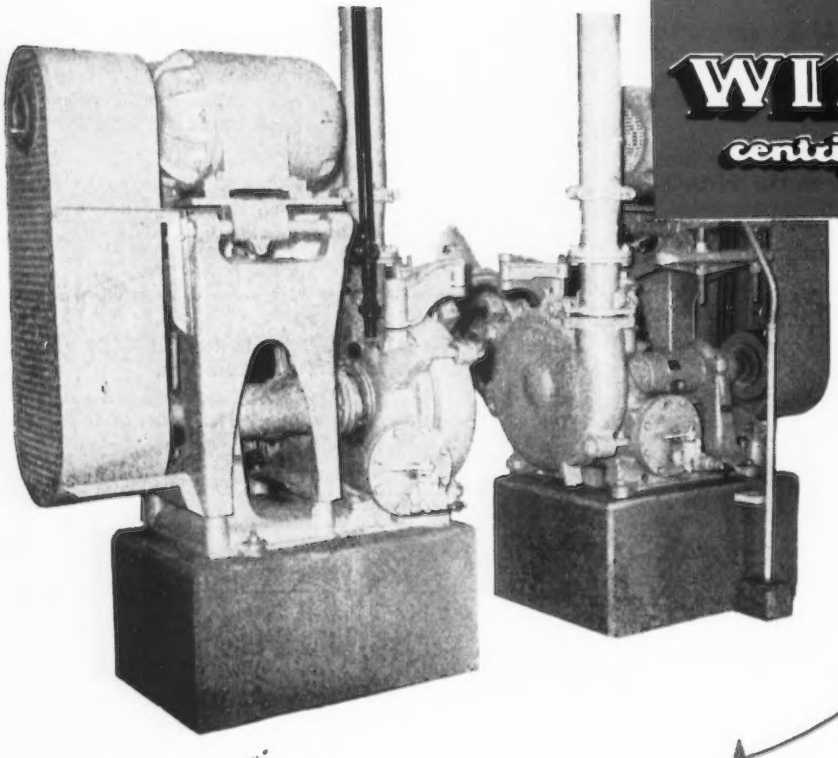

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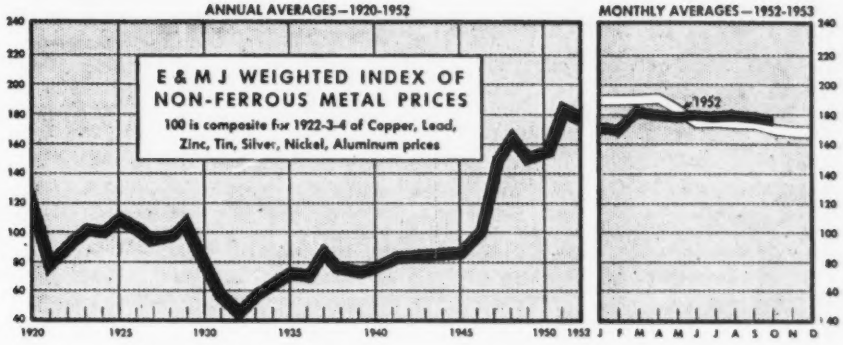
E&MJ OUTLOOK

PRICES



MARKETS

Slightly lower averages for some of the metals pulled the *E&MJ* index of non-ferrous metal prices down to 179.90 for October. The September level was 181.10.

Returning strength to European metal markets had U. S. metal men cautiously optimistic as October ended. Factors in the improved European position are: depleted inventories that must be filled; gradual reduction of governmental metal stocks; stepped-up purchases by Russia.

A better price in Europe than they can get in the U. S. is now open to foreign zinc producers. U. S. zinc imports are therefore dropping fast, are now down below a quarter of their peak rate of earlier this year.

A stiffening London market for lead had consumers eyeing the U. S. lead price speculatively. A rise is not certain, by any means, but at least a steady lead market is in the cards.

Lower copper prices still seem headed this way, although a series of last-minute events keeps delaying the drop. Once Chile's surplus is out of the way, downward pressure on the U. S. market will mount.

•

AT HOME

Cheerful news is that American manufacturing industries still plan to spend only about 8% less for new plant and equipment in 1954 than they spent in the record-breaking year of 1953. That's the finding of a recent survey of industry by the McGraw-Hill Department of Economics.

Plans could change, of course, but there's no evidence anywhere in the survey's results of widespread cutbacks in fear of a business recession. Big companies, utilities, mining, manufacturing, provide the main support for continued capital spending.

Our curbstone opinion, based in no way whatever on anything even resembling inside informtion, is that the anti-trust suit against St. Joe and AS&R will eventually collapse of its own weight.

Have you noticed that the world is using more silver than it is producing? The trend is in the direction of declining production, too.

Nothing but a switch to air-leg drills, as opposed to column mountings, enabled a Mid-west metal producer to raise output recently from 1,800 to 2,300 tons of ore daily.

•

LABOR

The outlook's bleak for Communist-dominated unions. See the report on p. 118 outlining NLRB's new and stiffer policy on unions, like Mine, Mill, that have an officer under indictment for falsely signing a non-Communist affidavit. Anti-Communist pressure within the union boils up, too, (see editorial). Could it mean the end for Travis & Co.?

MARKETS—Trends and Prices

Non-Ferrous Metal Prices Decline—Zinc Stocks Highest Since 1946

MAJOR NON-FERROUS METAL sales in October did not change greatly from September. General economic activity in October was almost as high as in September, possibly a little better. The Federal Reserve Board's preliminary seasonally-adjusted index of industrial production is about equal in October to September when it was 232% of the 1935-39 average. This index, which represents about one-third of total economic activity in the United States, is being revised. The Federal Reserve Board will introduce its new index, with a more detailed coverage of manufacturing and mining, next month.

Economic activity in the U. S. has declined fairly steadily since it reached its high point about March. At that time, the FRB index stood at about 243% of the 1935-39 level—it has dropped 11 points or almost 5%. This index is more closely related to demand for metals than many business indicators, because it leaves out sections of the economy such as trade and finance, etc., which do not consume metals in significant quantities. *E&MJ* estimates of metals use by industry in the U. S. move about the same as the FRB production index.

Metal Prices Decline

The *E&MJ* index of metals prices declined in October to almost 180% of the 1922-'24 average from 181 in September. This is the second successive month in which the metals price index has declined—September was nearly two points below August. For this year, our price index, like the FRB production index, reached its highest point in March when it was about 184½. In October, most non-ferrous metal prices were below their September levels. September was below August, largely owing to the lead and zinc price decline; these continued down slightly in October, but tin, and also copper have now joined them. Nickel, silver and aluminum prices have remained steady in the past few months.

U. S. Copper Imports Down

Copper sales in October were probably slightly better than in September—this may reflect a slight upturn in business, plus a low level of buying earlier. However any increase will not be enough to be considered important.

Total imports of copper, crude and refined, into the U. S. A. declined considerably in August from imports in previous months. Imports in August totaled 50,782 short tons, a drop of about 18% from the monthly average for this year of 61,893 tons. Net imports in August were 37,128 short tons—exports of 13,654 tons are subtracted from the import figure of 50,782—about 32% less than the monthly average net imports for this year. Imports have remained low since August.

The negotiations between Chile and the United States over possible purchase of perhaps 150,000 tons of copper now unsold by the Chileans, remained at the end of October "still unsettled." Reports late in the month were that some general principles were agreed upon by the negotiators, but this, if true, may be a long way from specific agreement. The feeling in the copper industry is that if and when the Chilean production again hits the market, the approximately 30c. price will rapidly become a thing of the past.

There is some belief though that the strikes in Chile will persist, or if settled will be followed by strikes elsewhere, thus preventing the full force of Chilean copper from hitting the market. At the close of the month, the Chuquicamata and Potrerillos strikes in Chile were continuing.

The strike at Noranda in Canada was also continuing; apparently the main difficulty now is union-management differences over dues check-off. The strike in New Mexico was terminated on October 9.

Prompt copper on the London Metal Exchange closed on the last day of September at £235 bid and £237½ asked and reached a maximum about October 20 of £247½. This was the equivalent of 30.9c. per pound. Trading had begun on August 5 at £217½. The Ministry of Supply on October 21 announced it would release copper to ease the situation resulting in a price fall to £240. The rise to £247½ was attributed to a squeeze. On October 29, the London settlement price for prompt copper was £242½. The *E&MJ* October price of U. S. domestic copper, refinery, of 29.598c. was down slightly from 29.623¢, in September.

In the third week of October, custom smelters raised their selling price to 29.2c. refinery (29.5c. Connecticut Valley) from 28.7c. This was not sufficient to raise the October average price up to the September level.

Zinc Stocks High

Statistics on zinc stocks at smelters for September showed an increase of 23,597 short tons to 141,494 tons. Most opinion is that stocks have continued to mount. Slab zinc imports through eastern U. S. ports have been running during October at about one fourth the rate earlier in the year, reflecting the low U. S. price. Purchase of zinc by the Russians is also considered a factor in imports.

Most people feel that zinc has reached bottom at 10c., with production curtailing now going on. But with heavy stocks, few believe the price is likely to rise sharply. The level of domestic zinc sales in October seems slightly below that for September indicating a possible pick up in demand in the near future, though some believe that consumers want to keep in-

Average Prices for October (E&MJ Quotations)

Copper:	
Electrolytic, domestic, refinery	29.598
Electrolytic, export, refinery	28.522
Lead:	
Common, New York	13.500
Common, St. Louis	13.300
Silver and Sterling Exchange:	
Silver, New York, per oz.	85.250
Silver, London, pence per oz.	74.000
Sterling Exchange, "Checks"	280.607
Zinc:	
Prime Western East St. Louis	10.000
Prime Western, delivered (g)	10.500
Tin:	
New York Straits	80.904
New York, 99% min. (e)	79.904
Gold, per oz. U.S. price	$35.000
Quicksilver, per flask	$183.423
Antimony (E&MJ) (d)	37.970
Antimony, bulk, Laredo	34.500
Antimony, in cases, Laredo	35.000
Platinum, refined, per oz.	$92.000
Cadmium (a)	200.000
Cadmium (b)	207.500
Cadmium (c)	215.000
Aluminum, 99% plus, ingot	21.500
Magnesium, ingot	27.000
Nickel (f)	60.000

Domestic quotations, unless otherwise stated, are in cents per pound. Sterling exchange checks, in cents. Quicksilver, per flask of 75 lbs.

(a) Cadmium average based on the producers' quotations.

(b) Cadmium average based on the average of the producers' and platers' quotation.

(c) Cadmium average based on platers' quotation.

(d) Domestic, 5 tons or more but less than carload lot, packed in cases, f.o.b. New York.

(e) Tin content.

(f) F.o.b. Port Colborne, U.S. duty included.

(g) Delivered where freight exceeds 0.5c.

Markets Continued on Page 104

ventories low, with tax computing time coming up.

Prompt zinc at the beginning of October in London was about £70 and rose to about £76½ on October 20. On October 29, it was at £76.

At the beginning of October, quicksilver was priced at $184-186, New York, per 76 lb. flask. By the end of the month, it had slipped by about $1. Mexican quicksilver was priced considerably under this. Early in October, Secretary of Commerce Weeks announced that contracts on distribution and end use of nickel were to be revoked, on November 1. The price remained at 60c., f.o.b. Port Colborne.

"Free" Gold Market

The estimated volume of sales of gold during October declined by about 5%. The overall tendency was for a weaker gold market. The British Government was reported to have purchased one million ounces at $36.25. It did not disturb the World Market. Pick's World Currency Report quotes "free" gold as follows, per fine oz.:

	COINS		BARS (12.5 kg.)	
	Sept. 30	Oct. 30	Sept. 30	Oct. 30
NEW YORK, transit	.....	.....	$36.35	$35.95
MANILA	$42.25	$42.00	36.90	38.60
HONG KONG	43.00	42.50	38.80	38.00
BOMBAY	48.00	46.75	48.35	45.50
TANGIER	41.75	41.70	36.35	35.95
BEYROUTH	41.35	41.50	36.50	36.10
PARIS	48.00	48.70	37.15	36.60
BUENOS AIRES	43.85	43.00	40.00	39.70

Note: All prices are computed at the free or black market value of the U. S. dollar in the local markets.

Major Metals

U. S. DAILY AND AVERAGE PRICES

Oct. 1953	Electrolytic Copper (a) Domestic	(b) Export	Straits Tin New York	Lead New York	Lead St. Louis	Zinc Delivered (f)	Zinc East St. Louis
1	29.425	27.925	82.750	13.500	13.300	10.500	10.000
2	29.650	28.125	82.250	13.500	13.300	10.500	10.000
3	No Market	28.225	82.250	13.500	13.300	10.500	10.000
5	29.675	27.975	82.500	13.500	13.300	10.500	10.000
6	29.625	28.100	82.250	13.500	13.300	10.500	10.000
7	29.650	28.175	81.500	13.500	13.300	10.500	10.000
8	29.650	28.225	81.250	13.500	13.300	10.500	10.000
9	29.675	28.275	80.500	13.500	13.300	10.000	10.000
10	No Market	28.225	80.500	13.500	13.300	10.500	10.000
12	Holiday	28.250	Holiday	Holiday	Holiday	Holiday	Holiday
13	29.650	28.550	80.750	13.500	13.300	10.500	10.000
14	29.625	28.525	80.000	13.500	13.300	10.500	10.000
15	29.500	28.400	79.000	13.500	13.300	10.500	10.000
16	29.450	28.800	79.250	13.500	13.300	10.500	10.000
17	No Market	28.800	79.250	13.500	13.300	10.500	10.000
19	29.500	29.225	80.500	13.500	13.300	10.500	10.000
20	29.300	28.750	80.500	13.500	13.300	10.500	10.000
21	29.625	28.600	80.000	13.500	13.300	10.500	10.000
22	29.600	28.600	79.500	13.500	13.300	10.500	10.000
23	29.625	28.700	80.000	13.500	13.300	10.500	10.000
24	No Market	28.675	80.000	13.500	13.300	10.500	10.000
26	29.650	28.850	80.750	13.500	13.300	10.500	10.000
27	29.600	29.025	81.000	13.500	13.300	10.500	10.000
28	29.700	28.875	81.000	13.500	13.300	10.500	10.000
29	29.700	28.750	82.250	13.500	13.300	10.500	10.000
30	29.675	28.600	82.000	13.500	13.300	10.500	10.000
31	No Market	28.875	82.000	13.500	13.300	10.500	10.000
AVERAGES FOR MONTH							
Oct.	29.598	28.522	80.904	13.500	13.300	10.500	10.000
AVERAGES FOR WEEK							
Oct.							
7	29.605	28.088	82.250	13.500	13.300	10.500	10.000
14	29.650	28.342	80.600	13.500	13.300	10.500	10.000
21	29.475	28.763	79.750	13.500	13.300	10.500	10.000
28	29.635	28.788	80.375	13.500	13.300	10.500	10.000
CALENDAR WEEK AVERAGES							
Oct.							
3	29.475	28.138	82.875	13.500	13.300	10.500	10.000
10	29.655	28.163	81.417	13.500	13.300	10.500	10.000
17	29.556	28.554	79.650	13.500	13.300	10.500	10.000
24	29.530	28.758	80.083	13.500	13.300	10.500	10.000
31	29.665	28.829	81.500	13.500	13.300	10.500	10.000

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

Oct. 1953	Sterling Exchange "Checks"	Silver (c) New York	Silver (c) London	Gold London	Gold (d) United States
1	280.1250	85.250	74.000d.	248s.	$35.00
2	279.8750	85.250	74.000d.	248s.	35.00
3	(e)	(e)	(e)	(e)	35.00
5	279.8750	85.250	74.000d.	248s.	35.00
6	280.0000	85.250	74.000d.	248s.	35.00
7	280.1250	85.250	74.000d.	248s.	35.00
8	280.2500	85.250	74.000d.	248s.	35.00
9	280.2500	85.250	74.000d.	248s.	35.00
10	(e)	(e)	(e)	(e)	35.00
12	Holiday	Holiday	74.000d.	248s.	Holiday
13	280.4375	85.250	74.000d.	248s.	35.00
14	280.5000	85.250	74.000d.	248s.	35.00
15	280.6875	85.250	74.000d.	248s.	35.00
16	280.6250	85.250	74.000d.	248s.	35.00
17	(e)	(e)	(e)	(e)	35.00
19	280.6875	85.250	74.000d.	248s.	35.00
20	281.0000	85.250	74.000d.	248s.	35.00
21	281.0000	85.250	74.000d.	248s.	35.00
22	280.9375	85.250	74.000d.	248s.	35.00
23	281.0000	85.250	74.000d.	248s.	35.00
24	(e)	(e)	(e)	(e)	35.00
26	281.1875	85.250	74.000d.	248s.	35.00
27	281.1875	85.250	74.000d.	248s.	35.00
28	281.0625	85.250	74.000d.	248s.	35.00
29	280.9375	85.250	74.000d.	248s.	35.00
30	281.0000	85.250	74.000d.	248s.	35.00
31	(e)	(e)	(e)	(e)	35.00
AVERAGES FOR MONTH					
Oct.	280.607	85.250	74.000d.	—	35.00
AVERAGES FOR WEEK					
Oct.					
7	280.000	85.250	—	—	—
14	280.359	85.250	—	—	—
21	280.800	85.250	—	—	—
28	281.075	85.250	—	—	—

Calendar Week Averages New York Silver: Oct. 3rd, 85.250; 10th, 85.250; 17th, 85.250; 24th, 85.250; 31st, 85.250.

(e) No market (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300¢ per pound, the average differential for delivery charges.

(b) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent, Atlantic seaboard. On f.a.s. transactions we deduct 0.075¢ for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingotbars; cathodes are sold at a discount of 0.125¢ to 0.15¢ per pound. Quotations for zinc are based on Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered, in the East, Middle West, and West, effective Jan. 1, 1951, commanded a premium of 1.35¢ per pound over the current market for Prime Western; Special High Grade 1.50¢.

(f) Prime Western delivered where freight from E. St. Louis exceeds one-half cent.

Quotations for lead are based on domestic common lead. Corroding lead commands a premium of 10 points.

(c) The Daily New York silver quotation reported by Handy & Harman is for silver contained in ores and other unrefined silver-bearing materials, in cents and fractions of a cent per troy ounce. It is determined by Handy & Harman on the basis of actual sales of bar silver .999 fine in amounts of 50,000 ounces or more for nearby delivery at New York, as reported daily by regular suppliers, and is usually one quarter-cent below the price paid for such bar silver, this deduction being the allowance to such suppliers for carrying, delivering and marketing. In addition to foreign silver, the quotations also apply to domestic silver if such silver enters into the New York market.

The Treasury's purchase price of newly mined domestic silver is 90.5¢ per troy ounce 1000 fine, effective July 1, 1946. London silver is pence per troy ounce, basis .999 fine.

(d) U.S. Treasury's gold price. Actual payment by the United States Treasury for gold is at .99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

Behind the By-Lines . . .

G. P. Lutjen

Brand new, from the nameplate on the president's door to the 70,000-lb. reverb, is the secondary smelter featured on the six pages starting at p. 72. This well engineered and well thought out (if this be redundancy, make the most of it) plant will provide many useful ideas to operating men at any smelter. One feature of the new plant you will be hearing a lot more about is the pneumatic conveying system. Like the boxing fan refers to a slick, young lightweight, "This is a comer".

Winners have been selected in the contest that E&MJ launched in last January's issue when we asked readers to see what they could do with a problem that was facing construction men at White Pine mine. You may remember that it had to do with building a water intake under 35 ft. of water. In case you don't recall, the problem is set up on p. 84 along with the winning replies. On p. 86 you'll find the story of just how the contractor did do the job.

Readers who like to keep up with things on the international mining tscene will find some tsolid reading matter in "Tsumeb Modernizes to Increase Ore Output", starting on p. 90. And the hipsters in the crowd will undoubtedly call attention to the fact that while there is a carefully drawn plan of de wet shaft (top, p. 91), no mention whatsoever is made of de dry shaft. —Man! We'll bet they're tsick of that one at Tsumeb.

There may be a fraud in your future. New York representatives of western or far western machinery manufacturers should beware of a new kind of confidence game that is being pulled. Here's how it goes: Mr. A., New York representative of the Gimmick Co. of Wyorado, receives a frantic 'phone call early in the morning from a Mr. X. who says he is foreman at the Gimmick plant, that he has lost his travelers checks, that he is stranded at the railroad terminal with his family—and could he borrow 100 or 150 bucks to get back home? Mr. X glibly mentions Jim, Bill and all of the well-known bosses and managers at the home plant, indicating complete familiarity with the Gimmick operations. Mr. A. has no way of checking with the home plant by telephone because of the time difference between New York and Wyorado. Mr. X. says he is in a hurry to catch the next outgoing train in about a half hour and asks Mr. A. to send up the cash with the office boy.

Mr. A. is in one heck of a predicament. He doesn't want to let a fellow member of the Gimmick company down; he doesn't know Mr. X,—but if he weakens he'll stand a good chance of being out $100 or $150 because this stunt has been pulled twice recently in the East, and in both cases the technique was the same. Fortunately in both cases Mr. X's story contained minor flaws, and at least two New York representatives missed being nicked—but only by a few microns.

A Montana School of Mines grad told us this story about the late Dr. Francis Thomson when he was head of the school. If ever a book of philosophy for mining men is compiled this should be incorporated.

With a wide acquaintanceship among miners and prospectors, Dr. Thomson was frequently visited by exuberant prospectors bursting with enthusiasm. Like as not they would chuck a piece of rich mineral bearing rock on the desk and ask, "What do you think of my new mine, doctor?"

Dr. Thomson, would reach into his pocket and take out his wallet. From the inner recesses of the wallet he would take forth one hair from a horse's tail, and holding it gingerly between his forefinger and thumb would extend it toward his caller with the query, "And what do you think, Pat, of my new trotting mare?"

There was a lot of comment on that recent letter from President Harold Sharp to the Howe Sound Stockholders. The missile dealt in part with the Garfield refinery where the Chemico process, on a shakedown cruise, is finding sailing somewhat less than smooth. Of all the comment, we liked best the note in *Chemical Week*. Crediting P. G. Wodehouse, CW observed that ". . . while Sharp may not be disgruntled, he's not exactly 'gruntled' either."

A lot of shows are opening in New York this season, but about as close as we ever come to them is reading what the critics have to say. Frequently it appears that the criticism is more entertaining than the play—if you would believe the critics. (We've often wondered where they get their special powers from). Our two favorite theatre reviews, classics in their own right, are both comments on acting in Shakespearean plays.

The first, commenting on an actor's nervous, inept portrayal of King Lear, said tersely, "He played the king as if he momentarily expected somebody to play the ace."

The other was a brief note. "Last night Mr. R—— played Hamlet. Hamlet lost."

All we're going to do is shrug when the boss asks us how this paragraph on critics fits in.

It seems that a large orange alligator, a green snake and a pink elephant were marching silently up 17th St. in Denver. When they got to the Brown Palace they quietly filed into the lobby and proceeded to that part of the hotel known as The Ship's Tavern. Noiselessly, they approached the bar and lined up in front of it with an expectant look on their faces. The bartender finally looked up from his glass polishing, seemed agreeably surprised, and with some regret in his voice, said, "Sorry, fellows, but he hasn't come in yet."

Well, as our dentist assures us, flourishing an electric drill and a sadistic grin, "A little pain never hurt anybody".

ENGINEERING AND MINING JOURNAL

NOVEMBER, 1953

Wanted—A Mineral Policy

"DEPRESSED CONDITIONS within numerous mining districts", said President Eisenhower, have caused him to appoint a four-man Cabinet committee, headed by Interior Secretary McKay, to look into the matter and recommend a new national mineral policy aimed at preserving a healthy domestic mining industry.

One can only applaud the motive at the same time that he deplores the headaches this committee will shortly develop. Let us outline one or two of them.

To begin with, the depressed conditions in certain U. S. mining districts are the direct result of actions by foreign governments. No U. S. "national" policy will help avoid similar actions in the future. The policy has to be international, in other words.

To be specific, U. S. zinc miners are out of work because of a flood of low-priced imported zinc. This zinc flooded the U. S. *not* because it came from low-cost current production abroad, but because foreign governments had mistakenly built up unmanageable metal surpluses and insisted on liquidating them in the world's only ready market, outside the Iron Curtain. No tariff barrier, short of virtual exclusion, would have dammed this flood.

We'd hate to have to come up with a workable answer to that problem by March 31.

Next, this committee must stand siege against numerous highly-vocal advocates of "Aid-To-Me-First", who will confuse their personal profit with the state of health of the domestic industry. If permitted to use it, the committee has enough experienced advice available to it to steer safely around these booby traps.

Further, they will face the question of how "healthy" a mining industry *is* in the national interest.

To us, the only ready answer is the necessarily vague statement that, in the national interest, the mining industry ought to include active, privately-owned and operated companies, both large and small, of a sufficient number and range of interests: 1, to maintain at least a significant production of all those mineral raw materials needed by this country's industries and found in reasonably recoverable form within its boundaries; 2, to maintain real progress in technological development in *all* phases of finding, mining, and processing mineral raw materials; and 3, to maintain a nucleus of men well-trained in the techniques of efficient labor and management in mines both large and small.

How do you do all that? Obviously, we can't start to answer that question here, but we do intend to take it up in succeeding issues. We hope also to keep you informed of the committee's thinking on these matters.

Meanwhile, why not send us your own views? What policy would *you* recommend if you were Secretary McKay?

Unionism vs. Communism

BY THE TIME YOU READ THIS, the election of new international officers of the Mine, Mill and Smelter Workers union will have been completed. The present group of officers amenable to Communist doctrine may be returned to office.

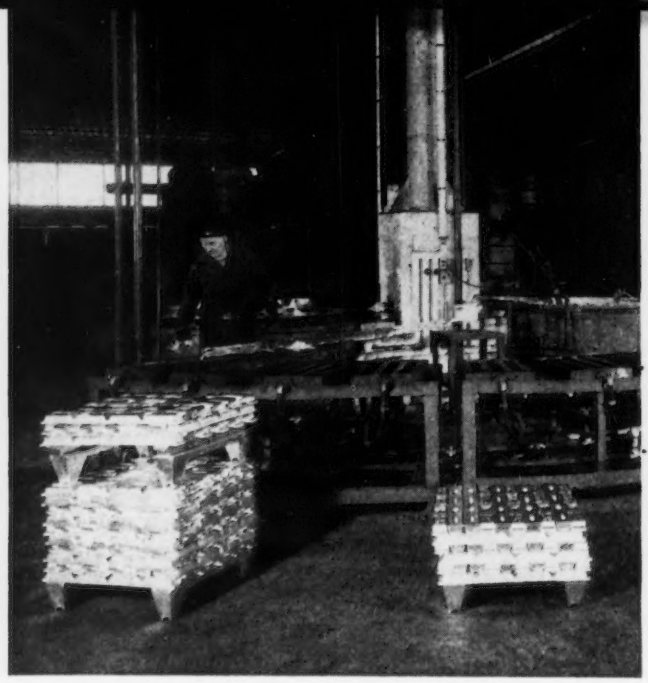
If they are not so returned, if the grip of the Communist Party on Mine, Mill is weakened appreciably, much credit must go to Butte Miners' Union No. 1 and Anaconda Mill and Smeltermen's Union No. 117, two Mine, Mill locals that finally broke with, and spoke out against, their union's left-wing leadership.

Putting up Charles McLean for International Secretary-Treasurer to oppose Maurice Travis, self-styled Communist sympathizer and former Party member, Butte Miners' Union No. 1, the oldest and largest Mine, Mill local, broke at last with a leadership which it calls "The Cominform's biggest, most noisome and effective fifth-column union bureaucracy in the United States and Canada."

Accusing the international officers of placing Communist Party directives ahead of legitimate union objectives, the Butte and the Anaconda locals promised a fight to the finish against Communist control. Knowing the temper and the ability of the average Butte miner, we expect the fight to be a good one.

We have no wish whatever, and we will never attempt, to inject our opinions into a union election or any other union affair. We could not resist calling to your attention, however, that the Party-liners in Mine, Mill had gotten Butte Miners' No. 1, the hard core of the union, angry at last. It could mean the re-birth of real unionism in Mine, Mill, and an end to Communism there.

ALUMINUM ingots being stacked for fork lift trucks, can be produced at rate of a million lb. per month.



LEAD from the two melting pots to the rear, is pumped or poured manually on water-cooled molds. Ample space

Brand New

WILLIAM J. FADDEN, JR.
Project Engineer
Kuljian Corp.
Philadelphia, Pa.

PNEUMATIC CONVEYING, automatic weighing, flexibility in casting and use of seasonal gas are just a few of the features of the modern secondary smelter recently placed in production by George Sall Metals Co., Inc., in Philadelphia, Pa. Engineered and constructed by Kuljian Corp. of Philadelphia, the new plant will produce ingots from aluminum, brass, zinc, and lead scrap. Every piece of equipment in the plant is brand new.

Aluminum Department

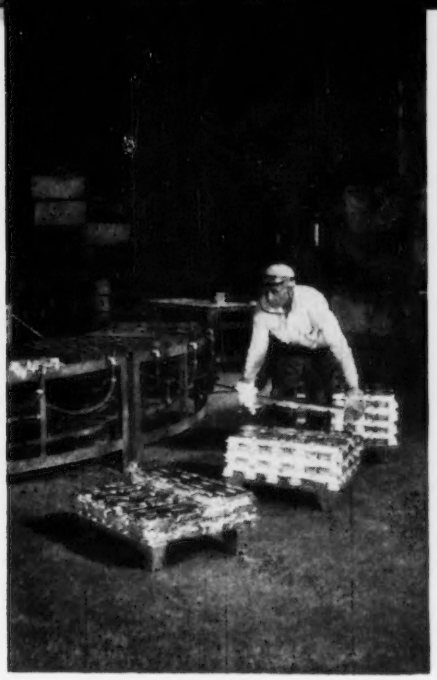
Raw oily aluminum turnings are unloaded from railroad box cars and trucks and are delivered to a chip-deck at ground floor level. The turnings are then manually fed to the crusher located just below the chip-deck. The crushing operation is important because it increases efficiency of oil extracton, helps magnetic separation of tramp iron, and increases the density of the material resulting in minimum storage space requirements.

After crushing, the turnings or chips are fed to a combination gas-oil fired rotary dryer by means of a screw conveyor. The cutting oils and compounds are vaporized and driven off through a stack. The chips are then delivered by means of a bucket elevator to a vibrating screen for separation of dust and dirt present in the chips. After being screened, the chips pass on to a magnetic separator, of the permanent magnet type, for removal of tramp iron found in the aluminum chips. The discharge of this magnetic separator is directed to a conveyorized batch weighing unit for continuous recording of the weight.

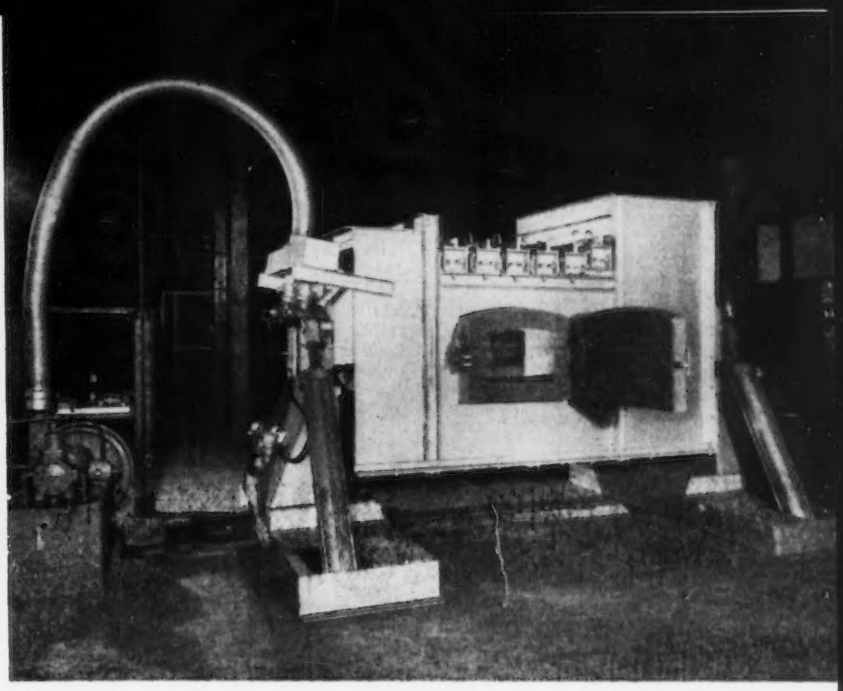
After weighing, aluminum chips are delivered pneumatically by a pressurized system to any of the six aluminum storage bins having approximately 240 tons (of aluminum) total capacity. Manually operated selector valves are supplied in this system for diverting the various alloys to their proper compartments.

A second pneumatic conveyor system of the vacuum type sucks the aluminum chips from the storage bins by means of a flexible pick-up hose and gulper nozzle. The chips are conveyed to a receiver filter which is elevated. Discharge from the receiver filter is accomplished by gravity with a rotary air lock feeder. The chips are fed into a hopper type scale which has a capacity of 500 lbs. Any predetermined batch weight up to 500 lbs., and the number of such batches, can be set by the operator. After the predetermined weight of chips is fed to the weigh hopper, an electrical actuating device on the scale head stops the rotary feeder. After a time delay to allow for weighing, the weigh hopper discharge gate, actuated by an air cylinder, automatically opens and discharges the material weighed into a surge hopper. After the predetermined number of batches are weighed, the entire system stops. For bookkeeping purposes the scale records the actual weight of each batch along with a symbol set by the operator to identify the particular alloy weighed.

Chips are fed into the surge hopper from the discharge of the hopper scale by a helical feeder into the air stream of the third pneumatic conveyor which is of the pressure type. The chips are blown by means of selector valves



is provided for lead and zinc storage and for future casting machines.



BRASS melted in this 5,000-lb. tilting reverberatory furnace makes up special alloys like aluminum bronze. There are also 3,000 and 35,000-lb. brass furnaces.

Plant for Secondary Smelting

to either of two surge hoppers, one located over the 70,000 lb. and one over the 50,000 lb. aluminum reverberatory furnace. The 30,000 lb. aluminum reverberatory furnace is not fed by this system.

Capacity of all the pneumatic systems is 5,000 lbs. of aluminum chips per hour.

In addition to aluminum turnings, baled aluminum pots and pans, aluminum castings, sheet, clippings, cuttings, airplane sections, etc. are also received. This material is sorted and stored loose. Approximately 150 tons of storage for this type of material is provided in bins near the six storage bins for turnings. Provision has been made so that, in the future, these bins may be converted to turnings storage bins and be connected to the pneumatic systems mentioned above. Additional storage area is provided for excess bulky materials in tote boxes. After an accumulation is made of the particular alloy, the tote box is picked up by a fork-lift truck, weighed and charged to one of the reverberatory furnaces.

The three aluminum reverberatory furnaces are equipped with temperature controls which regulate the oil or gas supply to the burners and maintain a predetermined melt temperature within + or —10°, which is satisfactory for this type work. These furnaces are so arranged that the melt can be poured to either the aluminum casting machine or the notch-bar casting machine. Since considerable amounts of low grade, high impurity alloys are received as scrap, and since there is a great demand for this type of material for the steel industry each of the above mentioned furnaces can pour to the aluminum shot pan for the production of aluminum shot. The notch-bar conveyor may also be used for the low grade high impurity alloys which normally require little chemical control or refining. Where refining is required, approximately 35% of the time required to produce aluminum ingot is spent in the removal of magnesium, silicon adjustment, and final chemical analysis. During this time no scrap is being melted in the particular furnace. This is one of the main reasons why additional furnaces were installed.

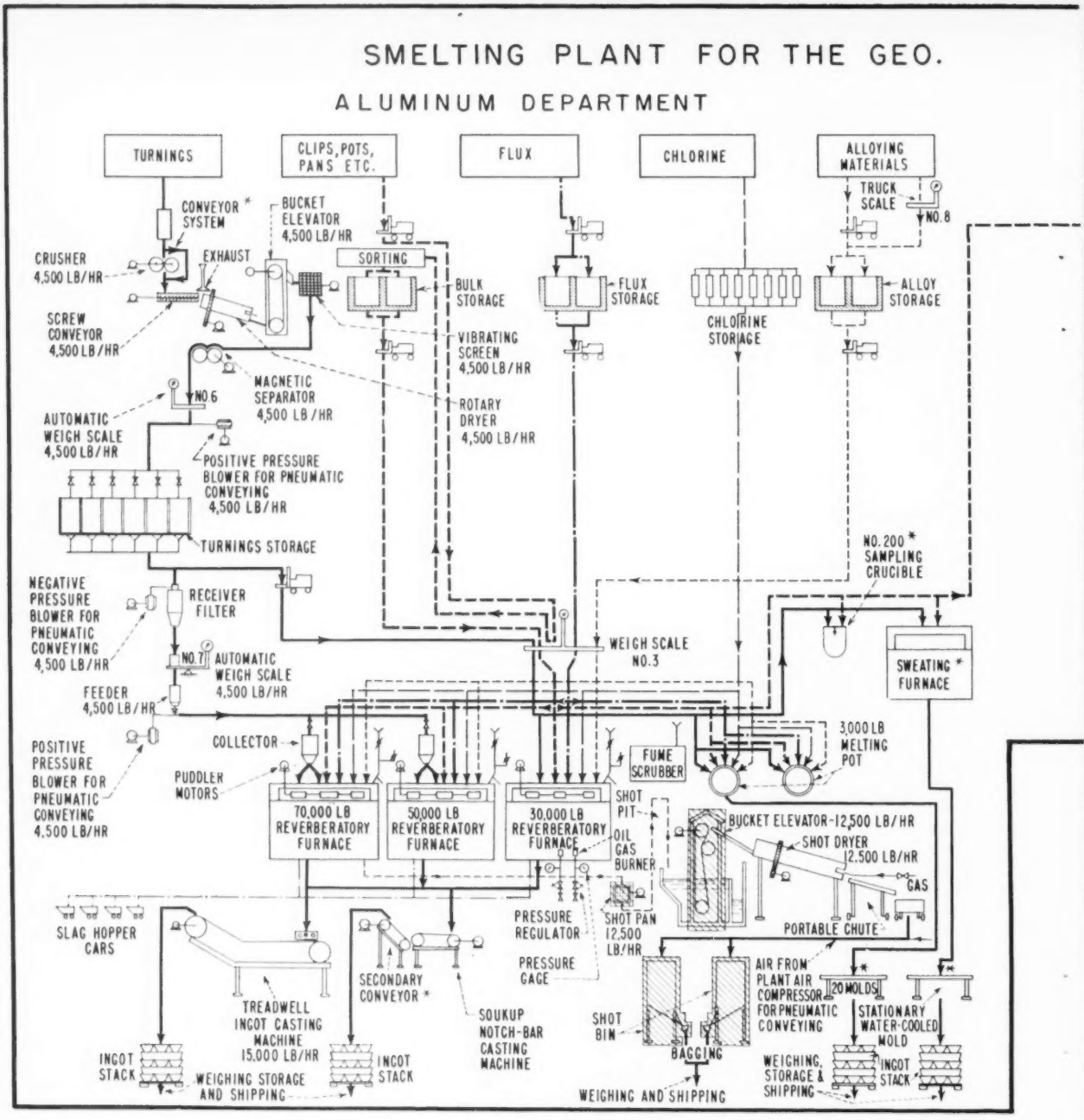
Elemental chlorine, fed from one-ton capacity cylinders, is introduced directly into the molten alloy heat. The fume thus formed is finely divided and strongly acid. The collection and disposal system consists of the following:

1. Individual furnace take-offs are equipped with slip joints, cleanouts, and dampers, (steel and cast iron). A steel main duct or flue leads to the outside scrubber installation.

2. Saturator: A monel duct equipped with 30° cone spray nozzle, drain and cleanout, connects main duct with suction of first scrubber stage.

3. Fume Scrubber. Two 12-in. diameter suction and discharge Schutte-Koerting water jet fume scrubbers in series, constructed of Haveg #60 (asbestos-plastic composition), discharge into concrete disengaging plenums integral with a sump. The gases, freed of solids and objectionable vapors, exhaust through a 45-ft. stack.

4. Circulating and Neutralizing System: A 15 hp. Durco pump takes suction from the sump and discharges through the nozzle of the first stage jet. (Fresh water feeds the second stage). Pump, pipe, fittings and valves are Durichlor, an acid and chlorine resisting alloy. Liquid caustic is con-

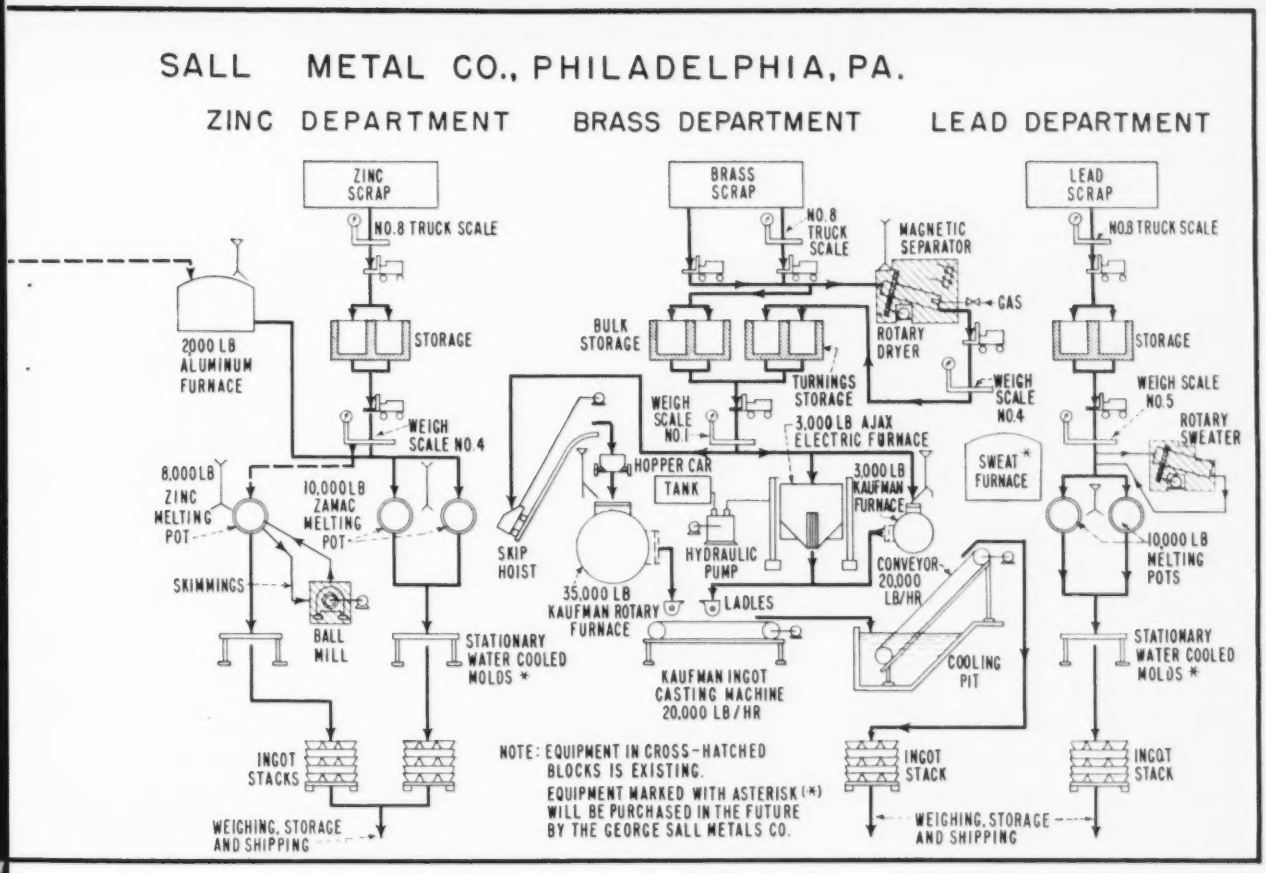


tinuously admitted to the circulating pump in operation. Effluent leaves the sump by overflow into a terra-cotta sewer line. The pump, caustic supply, all valves and controls, are inside the building.

5. Operation: During the refining operation, the furnace or furnaces being "treated" are sealed off by means of trap doors on the brick flues, and the fume take-off is affixed to an access opening in the furnace sidewall. The draft induced by the jet scrubbers assures no seepage of fume into the plant. The concentrated fume is quenched and humidified in the saturator before entering the two scrubber stages where the highly effective removal of contaminents take place.

Special Aluminum Storage

Aluminum ingots are porous; they readily absorb moisture and as the ingot sweats, dust clings to the surface. Keeping the aluminum ingots shiny has become a serious problem for the entire industry. This new plant includes an ingot storage room which is entirely closed, heat controlled, and dust proof, and supplied with filtered air to hold the aluminum ingots in a presentable condition. Provision is made for future humidity control. Storage space in this room is available for approximately 600,000 lb. of aluminum ingot of various alloys and approximately 300,000 lb. of various zinc ingot alloys. An electric



eye arrangement is provided to open and shut the entrance to this room for the removal of material for shipping, and entry of material for storage, all of which is handled by lift trucks.

In addition to the reverberatory furnaces, two melting pots are provided in the aluminum department and are used for small orders of special alloys of aluminum.

Slag, accumulated from the furnaces, will be formed in cast iron buckets and removed by fork-lift trucks to a waste area near the plant where most of the aluminum in the slag is reclaimed.

The anticipated production of the aluminum department is 1-million pounds per month. If a national emergency arises, this production figure can be increased materially.

Since seasonal gas was available, all furnaces, dryers, etc. throughout the plant were provided with combination gas and oil burning equipment. Economic studies indicated substantial savings with use of seasonal gas, which is available approximately seven months per year.

Brass Department

The brass department is made up of three furnaces and accessory equipment. The largest is a 35,000-lb. capacity rotary melting and refining furnace for copper base alloys, complete with overhead quick charging and multiple spout hydraulic pouring at a rate of either two, three, four or six ingots at a time. A skip-hoist elevates the charge, already weighed, to fill five hopper cars which run on rails over the furnace. These filled cars are rolled over the furnace charging door and emptied. When all cars are empty, they are returned along the rails to be filled again. The 35,000-lb. furnace pours directly into the main ingot casting machine, which is equipped with automatic charcoal covering for the production of smooth top ingots, automatic dumping, quenching, and mechanical loading of finished ingot in suitable containers. This main ingot conveyor is automatically controlled and can be manually operated.

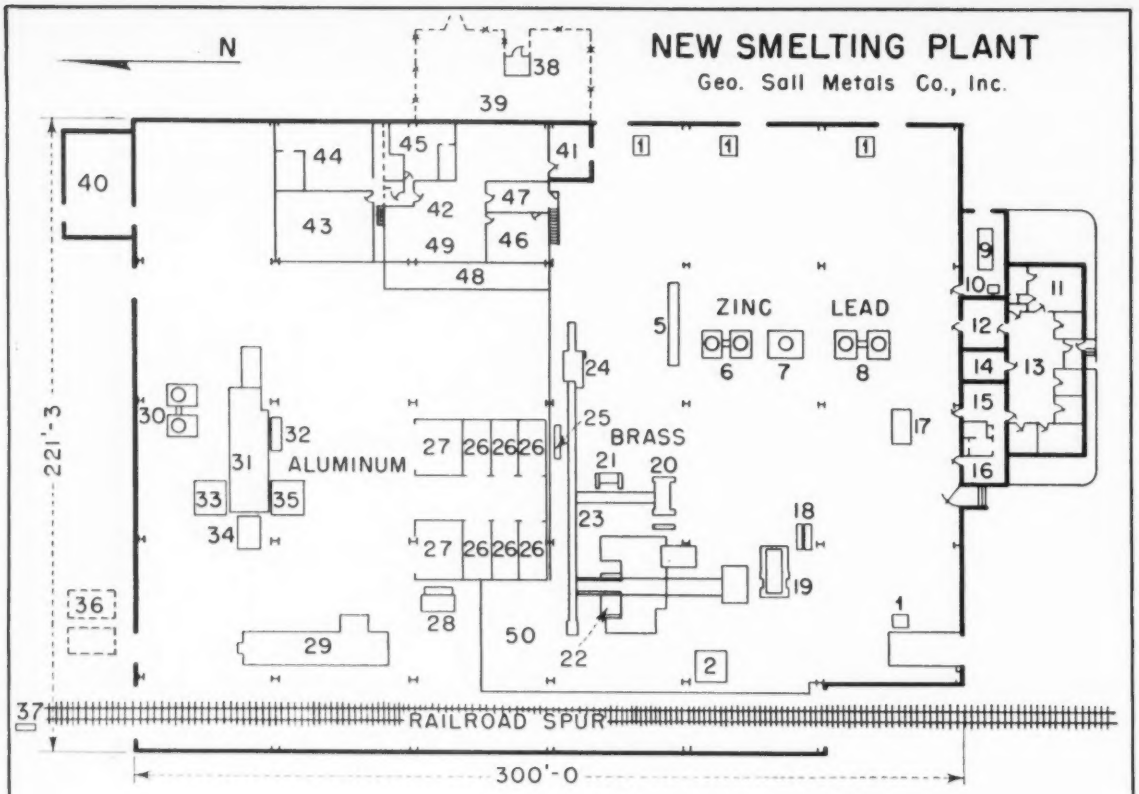
The second brass furnace is a 5,000 lb. capacity, tilting reverberatory brass scrap melting furnace which is arranged for hydraulic nose-pouring to a ladle transfer car which in turn pours on the main ingot casting machine. This furnace is used for special alloys such as "G" metal, aluminum bronze, etc., and is used to produce the initial melt required in the electric furnace. The initial melt is transferred to the electric furnace by means of a monorail with a transfer ladle.

The third furnace is a 3,000-lb. electric furnace which is used for yellow and manganese bronze. This furnace is hydraulically poured to the ladle transfer car which in turn pours on the main ingot casting machine.

The brass department also includes a rotary gas-fired dryer equipped with a magnetizing field at the discharge end, and is used to dry ,and magnetize certain types of material such as turnings, which contain grindings, washings, iron chips, etc.

All skimmings, etc., from the brass furnaces are stored in the yard area in back of the plant and are transported by fork-lift truck.

(Continued on p. 76)



LEGEND

1. Small receiving scale
2. Five-ton receiving scale
3. Fifty-ton truck scale (not shown)
4. Scale house (not shown)
5. Brass rotary dryer & magnetic separator
6. Zamac melting pots
7. Zinc melting pot
8. Lead melting pot
9. Heating boiler
10. Office air conditioning unit
11. President's office
12. Conference room
13. General office
14. Vault
15. Ladies' lounge and rest room
16. Superintendent's office
17. Baling press
18. Shear
19. Baler
20. 5,000 lb. brass reverberatory furnace
21. Electric furnace
22. 35,000 lb. brass rotary furnace
23. Brass ingot casting machine
24. Quenching pit and mechanical loading conveyor
25. Air compressor and receiver
26. Aluminum chip storage bins
27. Aluminum bulk storage bins
28. Transfer and weigh station for aluminum chips
29. Aluminum turnings crusher, rotary chip dryer, bucket elevator, vibrating screen and magnetic separator
30. Aluminum melting pots
31. Pit for aluminum ingot casting machine and notch bar conveyor
32. Shot casting equipment
33. 50,000 lb. aluminum reverberatory furnace
34. 30,000 lb. aluminum reverberatory furnace
35. 70,000 lb. aluminum reverberatory furnace
36. Fuel oil storage tanks 10,000 gal. each
37. Chlorine unloading platform
38. Meter house
39. Switch yard
40. Maintenance shop
41. Switchgear room
42. Laboratory, dark room, spectography room
43. Men's lunch room
44. Men's locker room and showers
45. Supervisors locker room and showers
46. Laboratory office
47. Sampling room
48. Ramp from high level to ground level
49. Ingot storage room (under laboratory)
50. Chemical storage area

Lead and Zinc Departments

Two Zamac (10,000-lb. capacity) and one zinc (8,000-lb. capacity) melting pots are provided in the zinc department. Stationary molds are poured manually or by pump. Sufficient space is provided for future casting machines.

Two lead melting pots are provided in the lead department and are poured manually into stationary molds.

Sufficient area is available in the lead and zinc department for scrap and finished ingot.

Jobbing Department

Miscellaneous scrap is received in the jobbing department and is sorted, sheared, baled, or rejected to waste. This department often ships baled material directly, but the majority of scrap received is directed to the other various departments of the plant for production of ingots.

Electrical Installations

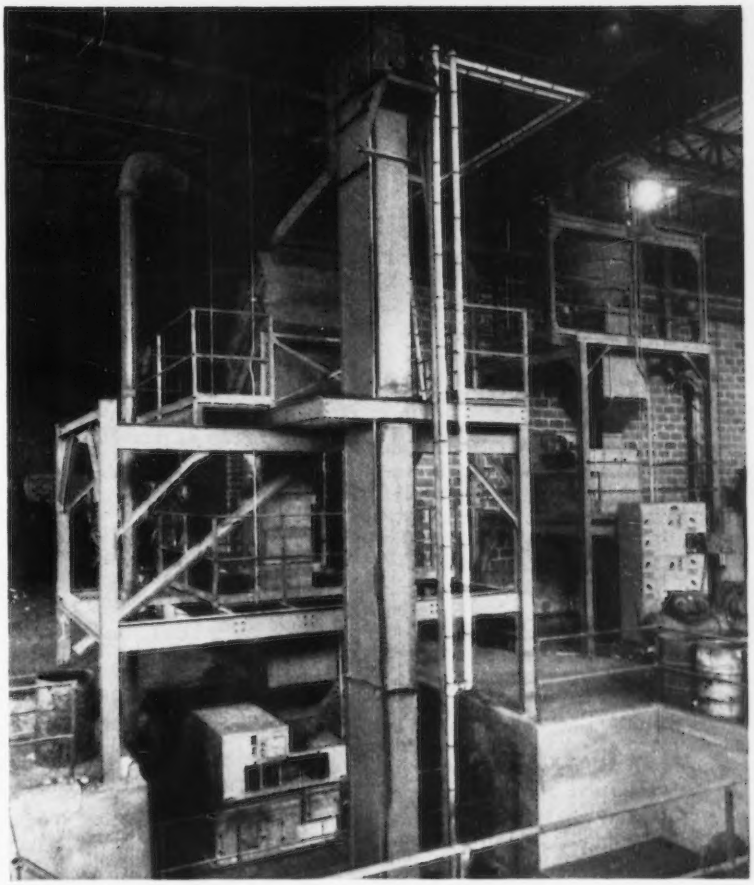
Electrical power for the plant is purchased from Philadelphia Electric Co. at 13,200 v., 3 phase, 60 cycle. This power is stepped down to 480 v. in an outdoor sub-station. Transformers are connected delta/delta, thus, if one transformer fails, an open delta connection can be used and the plant kept in operation. A single phase 333 kva, 13,200/480 v. transformer is also located in the outdoor substation

for supplying single pass phase power to the 300 kw. electric furnace. This transformer is connected to a wall-mounted 800 amp. air circuit breaker and then through the furnace control panel to the furnace. A bank of 240 kva capacitors is provided for power factor correction of the electric furnace.

The 480-v. switchgear consists of a main 1200-amp. air circuit breaker and five feeder air circuit breakers. All breakers are the drawout type for ease of maintenance and repair. The feeder breakers supply seven motor control centers located conveniently throughout the plant. Each motor is connected to a combination magnetic starter with air circuit breaker mounted in a motor control center. Motor control centers are located near the center of load of their respective motors and thus ease of operation and maintenance is obtained.

The plant lighting system is fed from eight 30 kva, 3 phase, 480-120/208 v. dry type transformers located throughout the plant. Each transformer is fed from a circuit breaker mounted in the nearest control center. Each lighting transformer is connected to a 120/208 v. 3 phase, 4-wire solid neutral, circuit breaker type, lighting panelboard.

Office and laboratory areas are illuminated by fluorescent fixtures and a maintained intensity of 50 foot-candles is obtained. The general plant area is illuminated by 500 w. dust-tight millite incandescent fixtures giving a maintained intensity of 15 foot-candles. The jobbing department area is illuminated by alternate 1000-w. incandescent and 400-w. mercury fixtures. The maintained illumination in the jobbing area is 30 foot-candles.



BUCKET ELEVATOR takes aluminum chips from dryer to vibrating screen at top, through magnetic separator, scale, and into storage bin via pneumatic conveyor. Scale (right) weighs chips from storage and automatically discharges correct amount to reverbs.

Heating, Ventilating and Air Conditioning

The building is heated with a 5 psi. steam heating system with gravity returns draining to a condensate receiver and pump unit recessed below the boiler room floor. Steam is supplied by a 100-hp. package type boiler using bunker "C" oil and equipped with gas/electric ignition. The front offices are heated with hot air fed through ducts in the suspended ceiling from a steam coil in a packaged air conditioning unit in the boiler room. Air is returned from the offices to this unit through underground ducts and return grills under each window. The laboratory section of the mezzanine is heated by hot air fed through ducts providing for a future air conditioning unit but at present using only a steam coil for winter heating. The remainder of the mezzanine (toilet and locker rooms) is heated by fin-pipe, wall radiation with grille covers. The front part of the plant area, containing the jobbing and shipping departments, is heated with large overhead unit heaters. The large railroad siding door is also blanketed with a horizontal-blo unit heater which operates whenever the door is opened.

Since most of the plant area contains excessive heat producing equipment, it is not necessary to provide additional heat for comfort. If at any time, however, this manufacturing equipment is idle, the large unit heaters in the front portion of the building will have sufficient capacity and coverage to hold the temperature of the entire area above freezing.

The air conditioning unit for the front offices is a packaged self-contained type with the steam coil for heating, as already mentioned. City water is used for compressor cooling and then wasted to the drain. The ductwork in the ingot storage room and the laboratory section of the mezzanine was originally designed for air conditioning, with summer cooling and winter heating. At the present time the cooling system has not yet been installed. If the owners think it necessary to add summer cooling at any future time, it will be necessary only to install a package type air conditioning unit with a connection into the present ductwork.

The manufacturing floor is ventilated with large capacity roof ventilators over all the main heat producing machines. These will be manually operated to quickly remove the air contaminents in cold weather or to remove the excess heat of the operations in the summer time.

Two Points Of

Our Protective Tariff Religion

HARRISON SCHMITT
Consulting Geologist
Silver City, N. M.

When Mr. Schmitt kindly furnished us with a reasoned analysis of the case for free trade among nations and tariff reduction, we invited Mr. Herres to present his views as well. Both men are careful students of these problems; both analyses are well worth your perusal.

The Editors

WE AMERICANS are fond of parading our so-called "free enterprise system" or "freely competitive market" as an example to the world. Yet we appear increasingly frightened by the realities of such an economy. In the present generation, we have been fixing prices, storing and destroying surpluses, subsidizing industry, dabbling with Socialism, and in general, blocking the free market directly and indirectly through red tape and even subversively in multitudinous ways. This policy resembles that of the Socialists and Communists. One of the oldest of these restrictions is the tariff.

We have come a long way (or retreated a long way) from the time in the early colonies when, as was then obvious to all, *any* restriction of the vital exchange of goods among the colonies themselves and foreign countries was impoverishing. Then trading, the exchange of goods and services, was essential for acquiring even the bare necessities of life. The obvious relationship of the exchange of goods to the well-being of individuals and groups became obscured, however, as the nation grew in size and wealth. Moreover, new conditions arose and tariffs levied for revenue only, progressed to those for "protection," that is, to indirect subsidies, for domestic industries old and new.

Today the tariff is an established institution. Like a religion, it is accepted on faith by many individuals regardless of their politics or degree of education.

Arguments for and against it are usually superficial and often emotional. Defenders of free trade are overwhelmed by the majority and by conscious or unconscious sophistry. The Truman administration was ahead of its party in supporting low tariff, for most Democrats today when lightly scratched are found to be of the same persuasion as the traditionally high-tariff Republicans.

The Eisenhower administration, however, at least an inner circle, has about the same views on the tariff as the Truman group. Furthermore, they extend their views on trade and on free enterprise to domestic affairs, which, surprising enough, now seems reactionary to many. It is doubtful if in the near future much of this philosophy can be transformed to effective action particularly in the face of the world-wide recession in commodity prices.

I am frankly an advocate of free trade in the international as well as the domestic sense, with the qualifications to be herein-after set forth, but I find that it is almost impossible to carry conviction in the average person-to-person argument because of the difficulty of convincingly presenting the basic economic factors in off - hand discussion, limited in time. Nevertheless, these factors, when coldly organized, can be clearly outlined. At the outset it is to be recognized that what is desirable may not immediately be politically or even economically possible. A long-term gradual adjustment may be needed. Therefore, let us examine the basic economic theory; then consider the modifications likely to be imposed by politics, the necessities of the national defense and other factors.

The most primitive economic state of human living is the self-contained family unit which by its own efforts must produce the necessities for survival. The family in this case has no tools save those of its own manufacture. Its well-being in terms of goods is narrowly limited. To say that for this unit improvement depends on the exchange of goods with other family units may sound like over-simplification.

Neverthless, one family living in an area of suitable chert deposits can make an excess of good arrowheads, another on rich bottom land can raise an excess of corn, a third in a wooded area can produce an excess of furs and so on. In each

(Continued on page 80)

Mr. Schmitt Says:

"We appear increasingly frightened by the realities of such (a free enterprise) economy.

"Wealth is created, and the common welfare promoted, by the efficient, unimpeded production, exchange, and distribution of goods and services."

"If a trade is made, both sides benefit, that is make a profit, otherwise the trade would not be made."

"Fundamentally, high prices are of no virtue to the whole economy."

"Sub-marginal material resources should be subsidized on a stand-by basis, rather than be depleted in peacetime."

"Any reduction of tariffs would need to be made slowly and with care."

"The give-away program (for foreign aid) can be partly or wholly offset by freer trading."

"All production is for the consumer, yet his interests and preferences are usually ignored."

View On Tariffs

Free Trade—Theories And Realities

OTTO HERRES, Vice-President,
Combined Metals Reduction Co.,
Salt Lake City, Utah

IT MAY BE CORRECT to say that price-fixing, subsidies, price supports, and the many other devices in common use by this generation to block the free market resemble the methods of the Socialists and Communists. But to include protective tariffs in the list would bring protests, even from Communists.

Tariffs afford the economic planners in the bureaus of centralized governments no opportunity to control business and regulate the lives of people. The economic "intellectuals" have no place for tariffs in their theories.

The tariff may provide a somewhat inefficient barrier against the competition of foreign goods and enterprise for parts of our economy, or for the whole of it. But back of that barrier the individual is free to provide for his own welfare to the greatest extent possible consistent with the respect for the rights of his fellow men. When people turn to devices of Socialism for protection, they are confronted with planning, controls and regulation. And under economic planning, they find that they do not run Socialism, it runs them.

Opposition to a protective tariff which has for its purposes the preservation of industries essential to national security and the welfare of the workers in those industries in fact comes, as might be expected, from those who are sympathetic to the Communist cause as well as free traders who have no liking for Communism. The reason should be obvious. Healthy active industries in the United States and workers enjoying decent living standards are not in the interest of those who seek to destroy the American way of life. They prefer to see our industries depressed and the workers left with no way to make a living. A free trade policy of our Government would aid them in their efforts to gain a greater foothold in the workers' organizations of American industry.

Obviously in colonial life trading, the exchange of goods and services is essential for acquiring the bare necessities of life. But as a country develops, it becomes more self-sufficient—provided it has natural resources, a favorable climate, and the will to work and a form of government that promotes individual freedom. Exchange of goods and services then must become adjusted to the changed conditions.

British Experience

It is true that England for decades dealt with the rest of the world on a free trade basis. As to the standard of living of her industrial workers at times during that era, there may be some question. But she no longer has free trade and her workers have converted the one-time empire into a welfare state.

Those who point out that Great Britain had free trade during the nineteenth century and benefited greatly thereby, fail to mention that much of her wealth came from the gold fields and diamond mines in South Africa, and the riches of India and the Far East, rather than competitive trade.

Britain taught the world to use machinery and accumulated great wealth by selling goods and exploiting the natural resources of colonial and under-developed countries. But the riches and resources have been wasted in the devastation of wars and lost in the turmoil of international politics. Apparently there are those who would like to have us follow the same destructive course.

Geneva, Annecy and Torquay

Is the tariff today an established institution accepted like religion on faith by most individuals regardless of their politics or education? Experience and observation indicate otherwise. Agriculture, mining, livestock growers, oil and other producers and processors of raw materials have been on the defense against free trade policies which threatened to destroy their existence for much of the time over the past twenty years. Perhaps there are those who do not recognize the terms Geneva, Annecy and Torquay. But to many American communities depending upon the production and payrolls of industry for support, these names signify several rounds of tariff reductions.

(Continued on page 81)

Mr. Herres Says:

"Tariffs afford the economic planners . . . no opportunity to control business and regulate the lives of people."

"Producers and processors of raw materials have been on the defensive against free trade policies that threatened to destroy their existence for much of the time over the past 20 years."

"We have been so engrossed in trying to save the world that the practical aspects of our problems are often forgotten."

"We are all ignorant, but on different subjects."

"What do cheap goods mean to a man without a job?"

"Assuming it is not American policy to liquidate small business in this country, some measure of protection is desirable."

"Most of us believe in reciprocal trade, and favor trade agreements that are truly reciprocal, but not many Americans will support the destruction of our industries by the dumping of imports."

"If . . . free trade . . . between the U.S. and Canada were proposed, which country would raise the greater objection?"

Our Protective Tariff Religion *(Continued)*

case the family production in excess does not add to the family wealth or even provide the necessities for survival unless it can be traded for the excess, but different and desirable products of other families. The family wealth and well-being, then are largely dependent on two economic factors: the desire and ability to produce efficiently and in excess some good or goods, and the ability to trade or exchange this excess with others who possess an excess differing in kind.

On the other hand, these primitive economic units are keenly aware of the impoverishment that results from even small interference with the exchange of their produce for other goods. They also are cognizant of the advantage of trading with the most efficient producer of a given product, for this producer can and will trade more units of the wanted good for a given unit than will the inefficient producer.

Trade Is Vital

The resulting drive for the efficient production and the exchange of goods in the primitive economy doubtless promotes the evolution of an integrated society and the growth of political units. Life and limb appear to be more valuable if there is a future of promise. Trade routes must be protected. Organized political units supply this protection. Society becomes more and more complex. Trading is made more efficient, versatile, and flexible by the use of mediums of exchange such as money and credit, and through the use of banking devices. But this complex development then hides from nearly everyone the true basis of well-being and the accumulation of wealth, even though basically it differs little from the primitive economy described.

Fundamental economic law, briefly stated, is as follows: *Wealth is created and the common welfare promoted by the efficient unimpeded production, exchange, and distribution of goods and services.* Anything that interferes with the normal, natural drive for trading reduces by so much the increment of the wealth of individuals or groups. If you challenge this, you challenge the very basis of civilization and the only way in which any considerable wealth originates. In the long run there cannot be a sale without a purchase or vice versa. Buying and selling, or, briefly, trading, must be in the long run a two-way exchange or a "two-way street."*

The *individual* consumer sees that if circumstances are such that he can temporarily buy goods and services without selling—usually, then, without working—he has reached the economic if not spiritual heaven all wish to attain. Much wishful thinking seems to be rushing in *that* direction today.

The great contradiction is this—the larger economic groups are anxious and willing to *sell* goods and, if they can't sell, then, *give* them away, or if in surplus *destroy* them, but they are terrified if an opposite group in return wants to sell, give, or dump its surpluses even if these surpluses are needed by many. In simple terms this means that the various larger groups often resist being given goods, i.e., wealth. It would be no more ridiculous if an *individual* refused a gift of wealth. Because of this contradiction man has impoverished himself through the centuries.

Self-Interest Dominates

How does this come about? It is because mass-man cannot understand abstract ideas and because small groups, even if they see the truth, are caught in a dilemma of self-interest. An individual may see that multilateral, that is, general, reduction of tariffs and consequent general increase in trading is a good thing. His own business, however, may benefit by the partial monopoly obtained through a tariff on the particular goods he sells. This, along with the general lack of comprehension of the general or national benefits in a multilateral tariff reduction, makes it usually politically impossible to obtain reductions—instead, it favors increases.

The question of the tariff, moreover, lends itself to several plausible, if fallacious arguments. One of the chief ones is that "we cannot compete with cheap foreign labor." The answer to this contains two elements. In the first place if one exchanges goods, if a trade is made, both sides benefit, that is, make a profit, *otherwise, the trade would not occur.* Secondly, a free economy may trade with one with a low standard of living and yet have a high standard of living, popular belief to the contrary notwithstanding. In other words it may pay high wages in a given gold-value of currency, whereas the other economy may pay low wages. That wages are not the most significant factor is illustrated by the trading of the South before the Civil War. Slave labor was used and the average standard of living was low. Yet mutually profitable trade was carried on with the North and the industrialized nations of Europe.

Low Wages And Trade

England, for decades, with relatively high wages and a high standard of living, traded with the rest of the world on a free trade basis. She shipped manufactured products to countries that produced raw materials, but which had low wage scales and a low standard of living. Countries with wages that are high, measured by gold, trade on an especially profitable basis with countries that have low wages (measured by gold) because of the high intrinsic value of their products; often the result of greater technical know-how. Normally here machines are traded for raw material.

It is widely acknowledged that much of Europe's low productivity and poverty is the result of trade barriers between the various countries. Nearly everyone in the United States advocates free trade for the countries of Europe but illogically does not want to apply it to his own country.

Correlative to the argument that we cannot compete with cheap foreign labor is the argument that to try to do so will reduce our own standard of living. This again has no basis. When goods are exchanged in trade both sides gain in wealth, or as we say, make a profit; otherwise the trade would not be made. The standard of living is thus raised on both sides. There is no leveling downward of standards. If such trading should by some quirk of international balance reduce wages, prices would also be reduced, but at a greater rate. Then the goods available to each individual would increase. Fundamentally, high prices are of no virtue to the whole economy. The critical thing is the amount of goods and services available for consumption by each individual or group.

(Continued on page 82)

* Of course, trade can be and often is three-way or even "polygonal" but this does not alter the basic argument.

Free Trade—Theories and Realities *(Continued)*

From an average rate of 50.02% during the 5-year period from 1931-35, our duty on dutiable items had declined to 12% in 1952. This is a reduction of 75%.

Free Trade Propaganda

It is amazing how many people have come to believe that peace and prosperity for the world will result from the United States' opening its doors to a larger volume of imports. A possible explanation may be found in the propaganda activities of the State Department and various Government commissions during the last twenty years. Washington is in a far better position to influence public opinion than the producers and processors of raw materials. The consequence of this is that many public groups and a large section of the press now are carrying on the campaign. It seems that we have been so engrossed in trying to save the world that the practical aspects of our problems often are forgotten. And for all of our slogans is the world nearer salvation than it has been at any time during the past 7,000 years?

Many of the organizations that endorse the free trade policies which have been promulgated by the State Department have very little understanding of the realities of production, trade and industry. We are all ignorant, but on different subjects. Under present world conditions, free trade is merely a utopian theory, wishful thinking that appeals to the academic mind. And perhaps to some it offers hope of cheap goods in a high-wage country, and opportunity to have your cake and eat it too. But as often has been said, there is no such thing as a free lunch. What do cheap goods mean to a man without a job?

Political and Social Complexities

It is all very well to use for an illustration of free trading the advantages of trading between family groups in a community, or by the division of labor in a primitive society. But the family groups apparently are working under similar conditions with respect to living standards and government policies. Under one government, as in the United States, trading may be carried on freely, in theory at least, between various groups in the many states to the benefit of all. But when the groups are under different governments, as is the case with the countries of Europe, South America and Asia, and many complex political, industrial and social factors are involved, it is no longer a problem of simple trading or merely a two-way street.

Of course, there always is the matter of self-interest to consider. If it were not so, we might have a United States of Europe and the different nationalities trading with each other just as the states of this country do, and less need to talk of "Trade, Not Aid."

A remedy for the chronic ills of a war-impoverished world cannot be found in U. S. pocketbooks, nor by selling goods to American consumers who already are supplied in most instances with ample quantities by their own workers. Solutions for the population problems of Italy, the excessive cost of the British welfare state and the trade barriers and competitive difficulties of Europe must be found in the countries themselves, not by removing what little remains of United States tariffs. Further tariff reductions by this country will work no miraculous cures.

Goods We Need

It may be true that trade can be carried on between the United States and countries where wages and living standards are low to the benefit of both sides. But such trade is in coffee, tin, nickel, and the articles we do not produce. Artificial barriers that have the effect of shutting out foreign goods which the American consumer would be glad to have and has ample means to pay for make no one richer. But when goods come into a country where they already are produced in substantial amounts and create an over-supply, there can be only one effect; lower prices and lower earnings, or unemployment for workers engaged in the industries affected.

But it should not be overlooked that for the European producer the real difficulty is that our country is largely self-sufficient and needs outside purchases only to supplement our own production. Consequently, a reduction in duty may result in a reduction in the price of the domestic product as well as the price of imports. The lower price possibly will cause some increase in consumption but more than likely will result in an actual decrease in value of the greater quantities imported. And in that process, someone may become poorer.

The Case of Zinc

An instance of this kind may be found in the case of zinc. The severe drop in price of this metal can be attributed to free trade policies of the Truman administration and the State Department program for financing increased foreign production of metals in preference to protecting domestic production essential for national security. The price of zinc has dropped from the O.P.S. ceiling of 19½c. a lb. to 10½c. in little over a year because of competition from heavy imports. In consequence, many mines in this country have been forced to close, or curtail production and thousands of miners have become unemployed.

Good Tools and Low Wages

We are told that we can pay high wages and compete with foreign industries employing cheap labor because we are more efficient. Today American methods, technical skills, machinery and equipment are going into use all over the world. And many of the workers in the United States came from foreign countries. In other words, we have no advantage in men, methods or equipment. We may learn from experience something more of the difficulties in competing with cheap foreign labor if ever the international crisis is ended. Then the seeds of depression planted during preceding years will come to harvest and be reaped by the administration in power if low-wage imports come into this country and our workers are unemployed.

It is certainly true that the great success of American industrial practice has been the ability to produce goods cheaper with good tools and high wages than those abroad have been able to do in spite of their low wages. But what about producing goods cheaper with good tools and low wages? During the five-year post-war period, the American taxpayer contributed $28.3-billion for foreign aid and during the first year of the Korean conflict an additional $4.9-billion, no small part of which went to provide our low-wage friends with good tools of production. Anyone who thinks that foreigners are too ignorant to be able

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Our Protective Tariff Religion *(Continued)*

It may be said, "That is all very well, but when I see my business ruined by imported goods you can't expect me to follow your argument." Admittedly this is the most difficult objection to meet. In an economy that has been "protected" for a long time, when certain businesses have enjoyed inefficiency and often abnormally high profits for a long time or an uneconomic monopoly, a sudden change in the status quo will result in an economic shock. Here our long-run sound economic philosophy clashes with short run economic and political reality. That is why trade barriers must be lowered slowly, with close control and a minimum of economic disturbance.

Defense Comes First

Difficult problems arise also when we consider the national defense. If we may be thrown back to our own boundaries in the next war, it is difficult to oppose maintenance, on a standby basis, of certain industries. Apparently few will admit to, and fewer face up to, the implications of such a possible contingency, and whether or not it should be seriously considered must be left to our military advisers.

After stock-pile requirements are met, and viewed *from the point of national interest*, it is difficult to see the logic or justification for depleting our sub-economic or submarginal resources by direct subsidy or tariffs. They may be badly needed in time of war, when our imports may be cut off. If practical politics or defense considerations make it necessary, the sub-marginal material resources should be subsidized on a *stand-by* basis rather than depleted in peace time.

Current politics make it difficult to carry out substantial multilateral reductions in tariffs, even if Eisenhower and his close advisers favor lower tariffs and freer trade. Some progress has been made these last few years by reciprocal trade agreements. Nevertheless, the issue will be eventually won if the critically articulate and influential minority, that is, the educated, thoughtful and public-minded group in this country can be converted and stimulated. This step should at least stop further increase in tariffs and perhaps start a slow reduction in the present ones.

One of the chief obstacles to tariff reform, and to the understanding of all economic questions for that matter, is our failure to carry out every day concrete habits of thought about buying and selling, which are dominated by the price of things in money, to the abstract economic thought necessary for complete understanding. This requires consideration in terms of the *exchange of goods and services.* Money is merely a facility, but it is also the "root of misunderstanding."

Our well-being as average individuals is not necessarily a function of our average money income. Materially, anyhow, it is the average amount of goods and services we are able to possess and consume, should we have the normal desire to possess and consume them. Lower prices mean of course that more goods may be bought with a given income. The striving for higher *money* income and wages is a rat race, with higher and higher prices always inevitable unless offset by increased productivity. This is inflation with sure rotting of the entire economic fabric. On the other hand, make things more efficiently, reduce prices, and money will buy more. Then life insurance policies, bonds, savings and promised pensions will *increase* in real value and not decrease as has been the case for the past several decades.

How Trade Helps

Free trade means greater abundance where scarcity exists; i.e., the goods produced can then be distributed efficiently. It means lower prices in terms of money but greater real income in terms of goods per average individual. Instead of lowering standards of living it inevitably raises them. How could it do otherwise? Each trading area benefits or a trade does not take place. A given nation by flooding another with goods cannot in the long run impoverish the latter. The argument falls of its own weight. *No one normally can be worse off by having more.* Reverse the coin—what happens in the small area if goods and services *cannot* be traded for other goods and services? Then wealth decreases and individuals become poor and can become destitute. The economics of larger trading groups cannot be different. Reduction of trading means reduction in general and in individual wealth.

Granted that any reduction of tariffs would need to be made slowly and with care, what are some of the *specific* advantages that would occur? Through various "plans" the United States is *giving* Europe vast quantities of goods which spell out, in the last analysis, depletion of our natural and human resources. Europe can supply us with many things: art goods, special machinery, scientific equipment, drugs, etc., which are either superior to our own goods, cheaper, or are unavailable here or would fill such shortages as commonly occur. These should be taken in trade for shipments of goods, many of which are now free gifts. The Congressional appropriations for foreign support and "Point Four" would not be needed in proportion as foreign exchange is built up in foreign countries by our imports. As matters stand now our total wealth is reduced by the amount of goods exported on a one-way basis. Certain industries benefit, but the country as a whole loses.

Handling Surpluses

General multilateral trading will provide an outlet for our many surpluses such as those of food and cotton, and will reduce destitution in over-populated countries like India, China, and Japan, and even Russia, and so reduce the potentials of misery that lead to conflicts, war, and conquest. These countries have raw and manufactured products such as iron, chrome, manganese, tungsten, antimony, cobalt and nickel ore, mica, fine rugs, gems, rubber, copra, etc., that are in short supply in this country. Obviously much of our wealth is going into an unavoidable military plant, but the give-away program, granted that some of it may be needed, can be partly or wholly off-set by freer trading.

As an example of the bad effect of restricted trade note our West Coast area. This is to some extent economically isolated from the rest of the country. Its natural trading area is the Pacific Basin, from which it should draw raw materials in trade in return for these same materials in manufactured form. Two-way or polygonal trade may be needed to help solve its growing population problem. The whole world wants our automobiles, typewriters, machine tools and hundreds of other goods in the efficient production of and quality of which we excell. Workers in high cost—now

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Free Trade—Theories and Realities *(Continued)*

to use tools to good advantage is in for a sad awakening.

Cotton, Tobacco and Automobiles

The fact that the agricultural South using slave labor before the Civil War was able to carry on mutually profitable trading with the industrialized North does not prove that slave labor in the textile mills of the South could not destroy the high-wage textile industry of New England today in competitive trade. What about the slave labor in the countries behind the Iron Curtain if the clouds of war should be lifted again? And what would happen to the cotton, sugar and tobacco of the Southern free traders if these commodities were not amply protected by import quotas, export subsidies, price supports, or gifts and loans to aid their purchase abroad?

But the cotton and tobacco growers of the traditionally free trade Southern states now find allies rather than opponents in the giant corporations of the North. Both favor "Trade, Not Aid" at the expense of smaller industrial and agricultural interests that are not favored with the advantages of mass production. Either the smaller operations are not susceptible to mechanization, or perhaps demand for their products is not sufficient in volume to justify mass production unless the entire output were merged and controlled by a monopoly. The so-called big interests of the Nineties have grown to world proportions under the tariff protection they once ardently favored. Today, their vast output is spilling over our great domestic market and they have become converts to the gospel of free trade.

Small Business, Large Payroll

Nevertheless, the smaller industries and segments of agriculture, mining and fisheries constitute a large proportion of the American economy and offer employment to many times the number of workers engaged directly or indirectly in providing our exports of $15-billion. These smaller industries are efficient in their fields, but labor costs represent a larger factor in their output than is the case of the giant corporations engaged in mass production. Productivity does not excel that of foreign producers by a sufficient margin to offset much lower wages prevailing abroad. Therefore, in case it is not American policy to liquidate small business in this country, some measure of protection is desirable if such industries are to have a place and contribute to the stability of our economy. A few big trees do not make a good forest. We need the thousands of communities throughout the land that are supported by the payrolls of the smaller industries and branches of agriculture for a balanced and healthy economy.

Strange Bedfellows

How long the cotton and tobacco growers, the Detroit corporations, the economic "intellectuals," the internationalists among us and their newspaper supporters and columnists will find their strange alliance compatible and profitable to their respective interests remains to be seen. They have not explained how the displacement of American payrolls in the smaller industries and communities by the increased imports they favor will produce more dollars in foreign markets if, as they assert, the industries unable to compete with low foreign wages and cheap imports represent a very small part of our economy. Why so much effort on their part against protective tariffs for so small an accomplishment? But if the displacement is of sufficient consequence to provide a great many dollars in foreign hands for the export trade, what about the market they have traded away at home? Our vast wealth derived from the mines and the soil provides the richest and most profitable market on earth to the mass production industries for what they have to sell.

Most of us believe in reciprocal trade, and favor trade agreements that are truly reciprocal, but not many Americans will support the destruction of our industries by the dumping of imports. Large corporations can move to foreign fields and receive U. S. Government assistance in their efforts to produce profitably when prices drop too low to permit profitable operation under our wages and living standards. But where does that leave workers and their families and the smaller independent companies and their stockholders?

It is beyond question that to most people money is the "root of misunderstanding." An understanding of the workings and functions of money is beyond the comprehension of the average individual. But after almost two decades of experience, it has become apparent to many in this country that for John Maynard Keynes, British economist, the United States was the greatest economic laboratory in the world. Planned economy would be the means of trying out age-old medication under new labels on the body politic.

And as a result of treating this nation with spending remedies in inflationary doses, Lord Keynes was able to tell the House of Lords during the 1945 debate concerning our tariff reductions and the international trade conference:

> . . . the United States is rapidly becoming a high-living and high-cost country. Their wages are two and a half times ours. These are the historical classical methods by which in the long run international equilibrium will be restored.

If a shortage exists in the United States and foreign materials are needed, world prices are high. But when production is expanding and a surplus is available, imports from low-wage countries are dumped on our markets to cause distress to our industries and unemployment for our workers.

From Sugar Cane to Machinery

Suppose the workers in the sugar cane growing industry of Louisiana should go to making machinery to be traded for the cheap sugar of Cuba as suggested. What about the machinery makers of Michigan, Ohio and Pennsylvania who already are more than able to supply the machinery needs of Cuba, to say nothing of the machinery makers of Britain, Germany, Japan and elsewhere who also are looking for markets for their expanding production? A few years ago we shipped Utah coal to Ireland and it added to our export trade, but the transaction was not sound business for someone concerned. Perhaps the same might be said of importing Coca-Cola in France.

Trade With Canada

And as to trade with Canada, Canadian tariffs are much higher than ours. It is probable that none of the equipment from the United States going to rebuild a Canadian

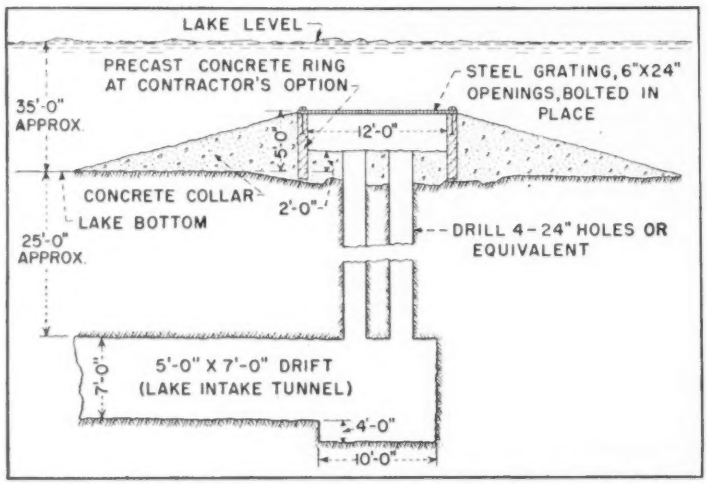
(Continued on page 106)

White Pine's Water Intake

E&MJ's Readers Tell How They Would Build It

In January, 1953, in an article on the new White Pine copper project, we asked ➧

How Would You Do This?



Shown above is the water intake that must be built on the bottom of Lake Superior, under 35 ft. of water, 1,500 ft. from shore. Send your plan for driving this drift, building the intake, and connecting it with the drift, as shown, to The Editors, Engineering & Mining Journal, 330 West 42nd St., New York, 36, N.Y. For the first five letters that come nearest to what the contractor actually does, we'll pay $20 apiece. All letters become our property.

Here are the five winning replies . . .

(The following were the first five suggested methods that came nearest to the procedure the contractor actually used in building the water intake under Lake Superior for White Pine Copper Co.)

Place a Caisson, Drive a Raise

EMERSON I. BROWN
American Embassy,
Rio de Janeiro, Brazil

IT IS ASSUMED that the 1,500 ft. of 5 x 7-ft tunnel will be driven from a single heading. A long drill hole should be carried ahead of the tunnel to prevent unpleasant surprises.

After locating and marking the center of the proposed intake structure, a suction dredge should clean off the lake bottom for a radius of 25 ft. about the center. Then a sheet steel open caisson, 14 ft., 6 in. inside diameter and about 38 ft., 6 in. high should be built. The lower section of this caisson, 5 ft., 6 in. high, will be bolted to the upper, 33-ft. section.

The caisson should be set over the intake site, centered, and grouted into place. Water should then be pumped out and the concrete ring, 5 ft. high, can then be placed. The

caisson's lower section acts as the form for this ring. The concrete mat on the lake bottom should then be poured, surrounding the caisson, through elephant-trunk pipes leading down from barge.

A diamond-drill hole should then be put down on the exact center of the intake structure inside the caisson. A sheet steel form, internal diameter slightly more than 4 ft. and 2 ft. high, is centered on the drill hole, and the bottom 2 ft. of concrete poured.

As an alternative to the suggested four 24-in. holes, a shaft 4 ft. in diameter is proposed. This shaft should be raised from the tunnel after it intersects the drill hole and the 10 x 11-ft. chamber is cut out. The last round of the raise would have to be handled carefully to avoid disturbing the concrete already in place.

When the raise is holed through, the steel grating may be placed over the concrete collar, and the upper section of the caission can be unbolted by a diver and removed. This upper section could be kept on shore to be used again if repairs to the intake or tunnel were ever necessary.

Place a Caisson, Sink a Shaft

P. R. McCLUNG,
Argus, Calif.

A CAISSON OR COFFERDAM should be built of a size and shape to permit construction of the concrete ring inside it. The caisson should be anchored on the lake bottom over the intake site.

The concrete collar and the outer ring should then be poured around the caisson to form a fluid-tight joint. Within the caisson, after the water is pumped out, the four 24-in. holes can be drilled with a Calyx drill. I would suggest, however, that a shaft of equivalent cross section be sunk instead.

After the shaft and tunnel are in place, and the ring and the steel grating are placed, the caisson can be cut off at the level of the grating and removed.

Pour Concrete, Build Cofferdam, Drill Holes

L. M. ROBINSON,
Triumph Mining Co.,
Triumph, Idaho

ASSUMING THAT ordinary hard-rock methods are possible in driving the 5 x 7-ft. tunnel, it should be carried out under the lake to the intake point. Silt and debris should be dredged from the lake bottom to bed rock. Concrete should then be poured on the lake bottom to the desired thickness over the intake.

A steel cofferdam, 35 ft. high and 14 ft. in diameter, should be built, brought over the concrete mat, and seated on it. The water should then be pumped out and a small (⅞-in.) diamond drill hole put down to connect with the tunnel. Any needed correction in location could then be made.

The four 24-in. holes should then be drilled through to the tunnel, and the grating concrete collar and grating should be installed over the holes. The cofferdam could then be removed.

Drive Piling, Raise Up Under It

J. WARD DOWNEY
Watsonville, Calif.

WHILE DRIVING the 5 x 7-ft. drift out under the lake, a cofferdam should be erected by driving sheet piling in a rectangle around the intake area wide enough to allow pouring the concrete ring shown in the diagram inside it.

Water inside the piling should be pumped out, and when the tunnel reaches the intake site, a 3 x 4-ft. raise should be driven up under the area enclosed by the piling. The concrete ring and collar should then be poured, and the raise concreted, too, if desired. The steel grating and a temporary cover should then be placed over the intake.

The sheet piling should then be pulled, and the concrete mat poured around the intake area by tremie. The temporary cover could then be removed to allow water to enter the tunnel.

Place Concrete, Cap Intake, Drive Raise

SOSIC VICTOR,
Mine Superintendent,
Trepca Mine, Stari Trg,
Yugoslavia

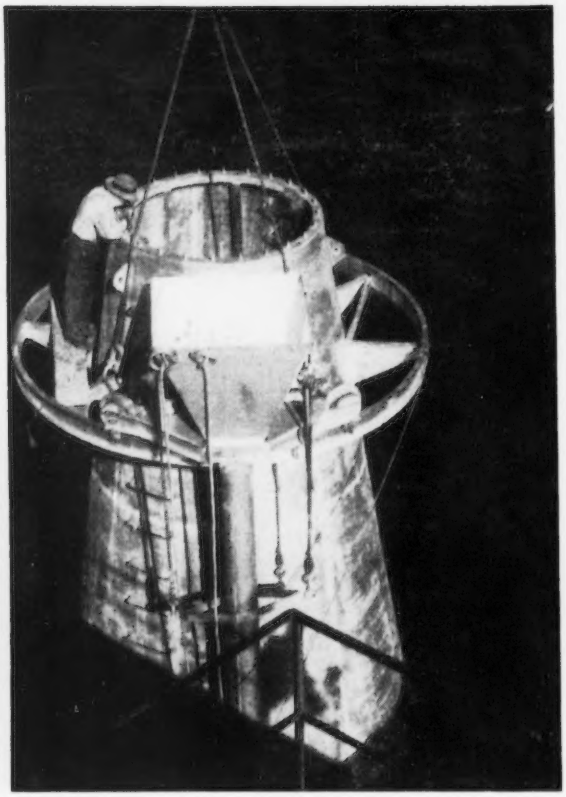
THE CONCRETE RING, or preferably a steel ring, should be prepared in advance, and be fitted with a steel cover (drawing enclosed) that would effectively seal it when placed over the tunnel intake. The lake bottom should be cleaned up and the steel ring lowered into place on the bottom. The cover is fitted with a valve which would be left open at this point.

Concrete work should then be carried on, directed by divers. When it is complete, the valve in the cover should be closed. A raise 4 x 4-ft. in section should then be driven up from the tunnel to connect with the concrete intake. If possible the last few feet should be broken without blasting.

The tunnel should then be cleaned out, the valve opened, and when the pressure is equalized, the cover may be removed. It can be preserved, however, for later use in any necessary repairs in the tunnel.

To see what the contractor actually did, please turn the page➡

BELL CAISSON, built in Duluth, brought to site by barge, gives access to lake bottom for pouring concrete, starting shaft to tunnel. Four of five winners had nearly same idea.



LOWERING CAISSON to lake bottom. It will project about 6 ft., allowing men inside to pour concrete collar, sink shaft to connect with tunnel. A diver completes job.

White Pine's Water Intake

The Contractor Tells How The Job Is Being Done

THE METHOD THAT IS BEING USED to construct the water intake for the White Pine plant and community involves the following steps: 1, a bell caisson was built and anchored on the lake bottom at the site of the intake; 2, the caisson was pumped out and the necessary concrete work done as shown in the drawing on the previous page; 3, a shaft was sunk inside the caisson to connect with a raise driven up from the end of the tunnel run out from the shore; 4, when this is completed, the upper part of the caisson will be removed and replaced with a grating set by a diver.

Zenith Dredge Co., of Duluth, Minn., has the contract for this work. The caisson was built in Duluth and brought to its location by barge (see photo). The lower five ft. of the caisson is actually a form for the concrete work, both the inner collar and the outer rings. The concrete collar has a 12-ft. inside diameter and a 15-ft. outside diameter. The caisson, itself, is 15-ft. in diameter at the bottom and about 34 ft. high. (Note how closely Mr. Brown's suggestion on the previous page matches these dimensions.)

The caisson is so constructed that the upper portion of the bell can be removed and stored for future use if repair work must be done on the intake.

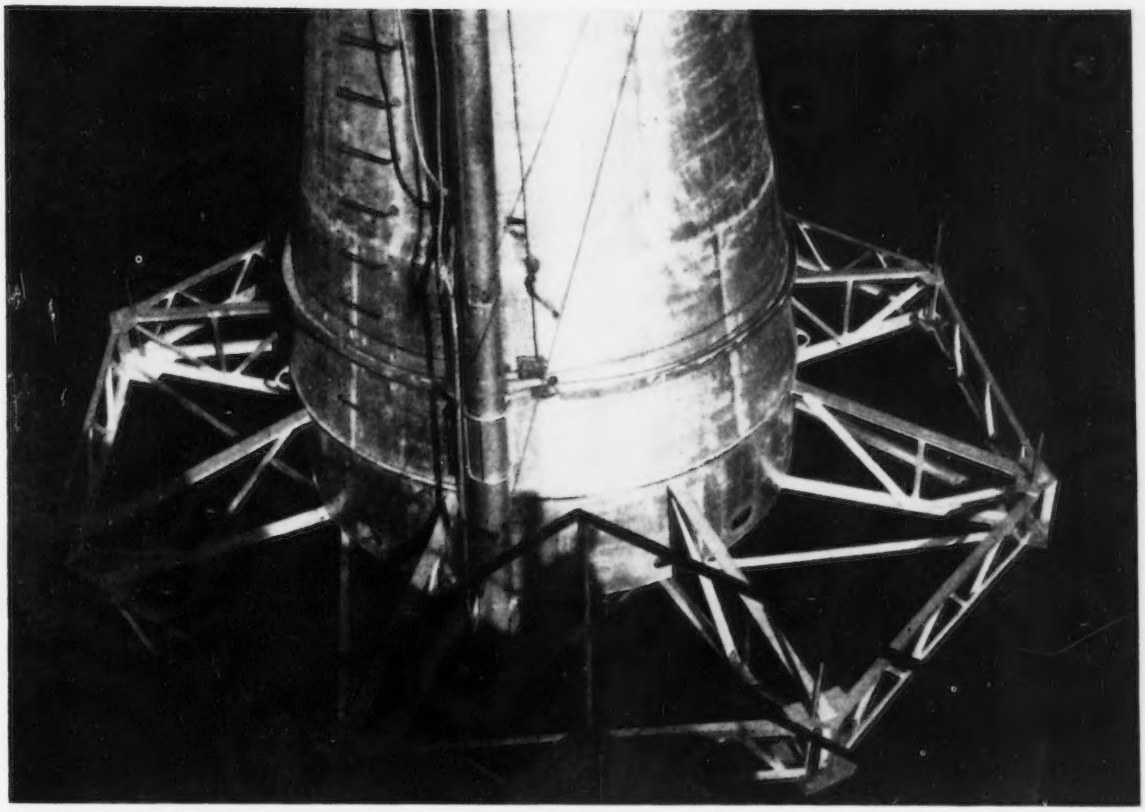
Shaft Is Sunk

When the concrete work is completed inside the caisson, a 4-ft diameter shaft is to be sunk to a depth of 12 ft. below the lake bottom. A water-tight cap will then be placed on top of the concrete collar, and the portion of the caisson above the collar removed. (Mr. Downey and Mr. Victor mentioned this detail).

Meanwhile, the tunnel is being driven out from shore to connect with the shaft. The tunnel will be 2,600 ft. long, 5 x 7-ft in cross-section. At the intake site, the tunnel crew will drive a raise up to connect with the shaft.

When this work is complete, all track and equipment will be removed from the tunnel, and the Zenith Co. will remove the water-tight cap and install the grating.

E&MJ expresses its appreciation to those readers who submitted their ideas on this job. We hope you found it of interest.



CAISSON'S ANCHOR is furnished by concrete poured around this steel frame, which rests on lake bottom and acts as form for outer concrete ring shown in drawing at head of article. The lower 5-ft. section of the caisson, to which steel frame is attached, can be unbolted, allowing removal of upper section. Job took 210 yd. of concrete.

TUNNEL IS DRIVEN, meanwhile, to point under caisson. Raise goes up to meet shaft sunk 12 ft. Intake is ready.

Honorable Mention

LETTERS from the following readers of *E&MJ* contained suggested methods of building the White Pine water intake that differed only slightly more than the five winning suggestions from the method actually used. We are sincerely grateful for their interest, and wish them better luck next time, because we will be watching for similar problems on which our readers can test their skills and imaginations against actual practice.

The Editors

Carl F. Austin
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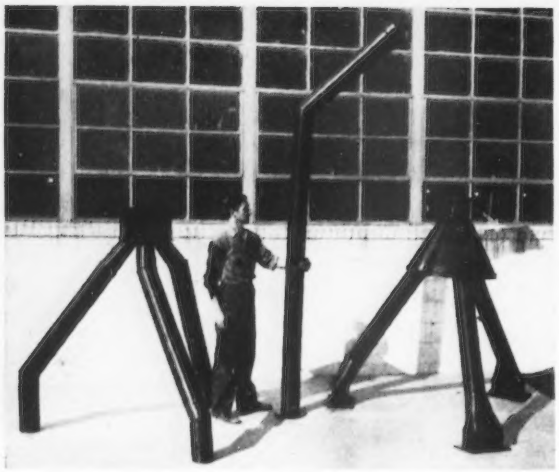
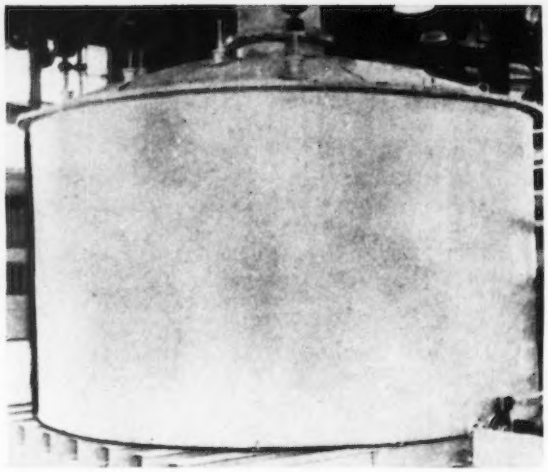


ALL-WELDED EXHAUST SYSTEM fabricated to remove corrosive vapors is made of plastic called Agilene**



LAMINAC TANKS at American Cyanamid chemical plant withstand corrosion, are cheaper and better than steel.**

How Plastics Can Help Mining

L. A. ROE
Bjorksten Research Laboratories, Inc.
Madison, Wis.

WHEN THE SUBJECT OF PLASTICS is brought up most of us immediately think of the flimsy plastic toys which our children break with monotonous regularity, of faded and warped decorative artifacts on our not-so-new automobile, and how wrong the forecasters were ten years ago when they predicted that plastics use would be so great by 1953 that half the metal mines would be shut down because of substitution of plastics for metals. Actually the current production rate of plastics is more than 2-billion lb. annually—or ten times prewar consumption. Plastics reached this present state of development because they are better suited for certain applications than any other known materials. Some of the desirable properties of plastics are their light weight, chemical inertness, good electrical insulation, durability, and ease of fabrication.

Emphasizing the importance of plastics to our national economy, F. J. Curtis, vice president of Monsanto Chemical Co. recently said "If every piece of plastic in this country were to fail in the next moment, all things utilizing electric power would cease to function." Mr. Curtis added that the use of plastics saves much electric power since it takes 34 times as much electrical energy to make one cubic foot of aluminum, and 25 times as much to make one cubic foot of steel, as it does to make one cubic foot of polystyrene plastic.

Men in the industry will do well to learn more about plastics because they can serve effectively in certain applications in mines, mills, and smelters. At the same time they pose a certain amount of competition to metals which cannot be ignored.

Reinforced Plastics

Broadly speaking, the term "reinforced plastics" covers any mixture of plastics, fibers, fabrics or other materials. A comparison with reinforced concrete is not far amiss since concrete contributes the compressive strength, body, and rigidity, while steel reinforcing bars or wire increase the tensile strength. In reinforced plastics the resin or "plastic" material is comparable to the concrete, while glass fibers, fabrics, or other materials provide the reinforcing stock. High-pressure plastic laminates usually contain phenolics and melamines (the latter used in plastic dishes) while the low-pressure laminates generally contain polyester resins.

Industrial uses for glass-fiber reinforced plastics are increasing rapidly. Glass fibers are among the strongest materials known to man. The atomic forces binding glass together are much greater than those for the most durable ferrous alloys. Strengths as high as 3-million psi should be theoretically possible. Strengths approaching 1-million psi have already been obtained. The goal of the laminated plastics industry is to utilize as much as possible of the great inherent strength of the glass fibers.

Rapid improvement of fabrication techniques and increased availability of good quality glass fibers has pushed plastic car bodies into the picture again. One type, the Glasspar body, weighs only 185 lb., uses two layers of glass fiber mat and two layers of glass cloth. The finished body is only about 0.2-in. thick and contains about 65% polyester resin and 35% glass. Reinforced boats up to 35 ft. long are being made for the armed forces (the Navy's LCVP).

It is estimated that about 19-million lb. of polyester resins for reinforced plastic products was sold in 1952. About 11-million lb. of fibrous glass was used in reinforced plastics. Demand for fibrous glass for 1953 production is expected to total more than 16-million lb. The latter figure is of interest to mineral producers since it represents a new and rapidly expanding market for glass sand, limestone, borax, titanium dioxide and other mineral products. There are now at least ten producers of fibrous glass prod-

* Photo, courtesy American Agile Corp., Bedford, Ohio.
** Photo, courtesy Carl N. Beetle Plastics Corp., Fall River, Mass.

Plastics in the Mineral Industry

PRESENT USE

- Safety helmets.
- Many types of electrical insulation
- Mine and plant models
- Piping and fittings
- Rod and ball mill bearings
- Wide variety of gaskets
- Quick pipeline patches
- Blowers, fans and fan blades
- Cylinders for servo-mechanisms
- Tie plates for railroad rails
- Coreboxes and drier plates for foundry use.
- Cements and adhesives
- Fume hoods and ducts
- Many types of tanks
- Non-corrosive valve seats
- Blasting equipment
- Corrugated roofing and siding
- Gears and pinions
- Mine conveyor belts (Germany)
- Metal forming dies
- Miner's lamps
- Goggles and welding helmets
- Small pumps and pump casings

POSSIBLE FUTURE USE (Based on references 3, 4, 5, 6, and 7 on P. 192)

- Metal-to-Metal seals which are stronger than metal welds.
- Lightweight mine supports
- Shaking-table decks
- Bearings in flotation cells
- Corrosion resistant coatings, resin and glass fibers.
- Complete temporary mine buildings
- Throw-away liners for chutes, spirals etc.
- Lightweight mine skips and cars
- Reinforcing material for concrete

ucts, and the list is expanding steadily.

Millions of dollars worth of platinum "bushings" (or spinnerets) are installed in glass fiber plants. To date no other metal has been found satisfactory for this exacting purpose. In this high-speed age it is interesting to note that individual glass fibers are drawn from these bushings at speeds up to two miles per minute.

Plastic Ball Mill Bearings

The first use of "non metallic" bearings on a grinding mill was reported by Horne[1] in 1937. During that year a 6x12-ft. Marcy rod mill was fitted with Micarta bearings. These fabric-reinforced laminated bearings were water lubricated and immediately gave good results. In his report Horne states that the bearings for grinding mills are designed "so that the unit pressure seldom exceeds 150 to 200 psi. This is a light duty compared to some of the applications of laminated bearings in steel mills where unit pressure may reach 8,000 psi."

Brown[2] reports that in Germany over 80% of rolling mill bearings are synthetic and that in the United States at least 50% of the steel produced at some time passes through mills equipped with fabric reinforced plastic bearings. Brown also shows that power savings due to installation of fabric bearings in various steel mill equipment range from 10 to 35%.

It is well known that water is the best lubricant for fabric bearings. Consequently water-lubricated plastic may prove practical in other types of mill equipment. Certainly this would be ideal for plants using a delicate flotation process because there would be an absolute guarantee that lubricating oil leaks would not disrupt the flotation circuit!

Micarta water-cooled bearings are now used in the 11-ft. Hardinge Tricone mills installed in Barvue's modern 4,000-ton mill in Quebec.

A Simple Way to Identify Plastics

Hold the specimen in a nonluminous Bunsen burner flame.

1. If no flame is produced, the plastic may be polytetrafluoroethylene (Teflon or Kel-F), vinylchloride copolymer, vinylidene chloride, or one of the formaldehyde plastics.

2. If the specimen burns, but is self extinguishing on removal from the flame, the plastic may be laminated phenolic resin, casein, aniline formaldehyde, a polyamide, or melamine resins.

3. If the specimen continues to burn after removal from the flame it may be cellulose nitrate or acetate, acrylic, some polyamides, polyvinyl butyral, polyethylene (which melts and drips; drippings burn with paraffin odor), allyl esters, or polystyrene.

Plastic Pipe and Hose

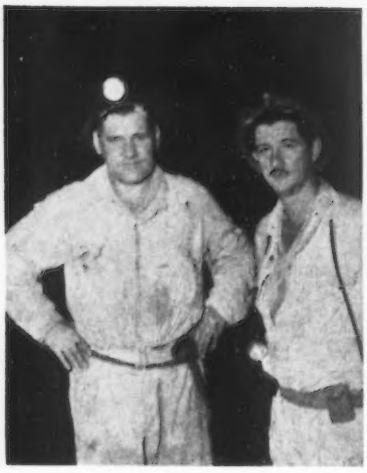
Use of plastic pipe and hose has soared because of its light weight, ease of installation, corrosion resistance, and lower overall cost. According to the Paley Report "The 1950 market distribution (volume was 5.25-million lb., valued at $7-million) was estimated to be about half for handling corrosive coal mine water, over a third for handling brines and very sour crude oil, and the remainder used in food handling and processing plants and farm water wells."

The most popular plastic pipe is made from polyethylene plastic. Its relatively low cost and ease of manufacture indicate that it will continue in a leading position for some time. Laminated phenolic resin and laminated glass cloth or fibers formed into piping are also becoming popular, but are still quite expensive for ordinary uses. Cellulose acetate butyrate tubing is used in the oil fields for salt water disposal. The cost is considerably less than for stainless steel pipe.

An interesting glass fiber-plastic patch developed by Cordo Chemical Corp. in collaboration with the U.S. Navy is now attracting much attention.[8] This patch will provide a water tight seal within 35 to 55 min. to pressures of 500 psi. The patch may be applied to such materials as steel, iron, lead, aluminum and porcelain. It withstands temperatures as high as 450 deg. F. Tests show the patch to be successful on lines carrying water, compressed air, steam, gasoline, dry abrasives, and various chemicals. This new development may be the answer for many emergency repairs in the mine, mill and smelter.

An indication of the growing interest on the part of the minerals and metals producers in the plastics industry is the close watch be-

(Continued on page 192)



G. V. SCHOLTZ, mine captain, left, and F. C. Pickard, author, right.

TSUMEB'S MODERNIZATION PROGRAM included a new shaft, new mill, additional surface quarters, and completely revamped mining methods.

Tsumeb Modernizes Mine To Increase Ore Output

FRANK C. PICKARD
Superintendent
Tsumeb Corp., Ltd.
Tsumeb, S. W. Africa

AFTER TSUMEB CORP., LTD. purchased the O.M.E.G.[1] holdings from the Custodian of Enemy Property of Southwest Africa Jan. 6, 1947, the company was confronted with a flooded mine that required complete modernization. The following article describes important steps taken to revamp the Tsumeb mine.

Mine unwatering proceeded from August, 1947 to August, 1948. Before any development work was started, the mine pumped only 1200 gpm: today the volume is 2400 gpm.

The old steam hoist in the No. 1 shaft was antiquated, and subsequently replaced by a Canadian Ingersoll-Rand 60x96-in. unit capable of hoisting 5-ton skips of ore from 2,000 ft. at 1500 fpm. Lack of headroom in the headframe resulted in the adoption of a bottom-dump skip instead of the conventional Kimberley type. Since the mine was a one-shaft operation and the skip bottom sloped, a dinky cage was installed above the skip instead of below it. This improvisation has paid for itself in many emergencies when mechanics and electricians were urgently needed underground during hoisting periods.

As skips and cages operate in the same compartment, a skip-change device was installed. Only one side of the shaft was available for changing because of the ore-bin arrangement. This problem was solved by installing a system of overhead tracks and trolleys. Limited space between the compartments ruled out the use of folding guides and led to the development of the collapsing guides now used. Both skips and cages are now changed in 20 min. This remodeled shaft now handles all men and supplies and has hoisted as many as 350 skips in 24 hr.

Water Hampers Shaft Sinking

To meet the planned production rate of 50,000 tons per month, the No. 1 shaft had to be supplemented by a new one, the De Wet shaft. (See plan illustrated.) An entire organization was borrowed from an Orange Free State gold mine to sink the shaft. This crew sank the shaft to 2,865 ft., and locally trained men will complete the job to 4,150 ft.

The new shaft is equipped with a Canadian-Ingersoll-Rand 120x80-in. hoist capable of lifting 6 tons of ore from 4,000 ft. at 2300 fpm, and a 120x80-in. man hoist.

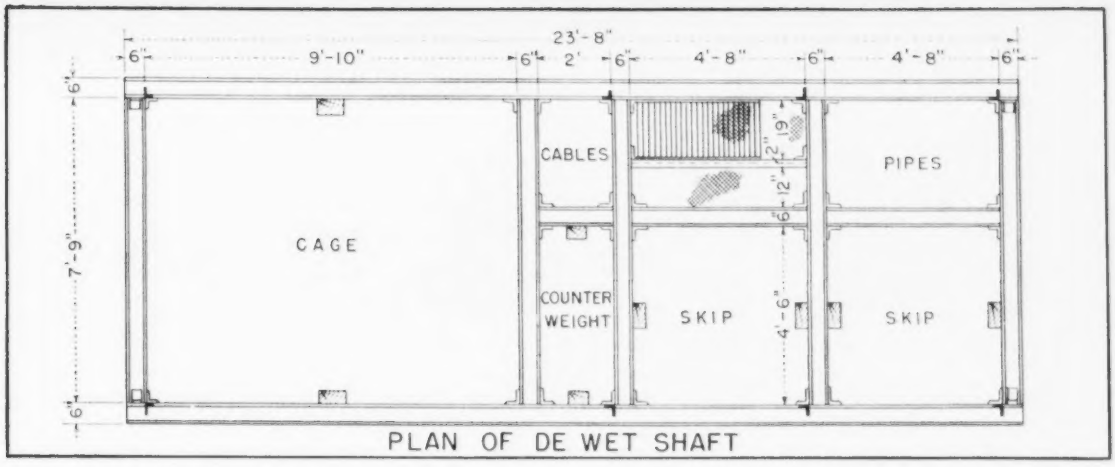
Large quantities of high-pressure water were encountered 1,900 ft. below the collar of the new shaft. Cementation Co., Ltd. (Africa) was called in, and all subsequent sinking was done through a cement cover.

A very porous fault zone dipping 44 deg. was encountered at 2,900 ft. Over 1,000 tons of cement, 43 tons of calcium chloride, and 6,800 Imperial gal. of sodium silicate were injected into the fault during two periods totaling 100 days. As it was not possible to cover the fault in one lift after sinking was completed to the first cover, the shaft was lined with 323 cu. yd. of concrete and 4 tons of reinforcing steel. After the lining had been completed, a 125-cu. yd. concrete mat was placed over the unconsolidated shaft bottom. The second lift took only 2,200 bags of cement, but large quantities of calcium chloride and sodium silicate were used to seal fine fissures. After the second section had been sealed, sinking continued to solid rock and the last 78 ft. of lining was placed requiring 542 cu. yd. of concrete and about 10 tons of reinforcing steel.

Haulage System Revamped

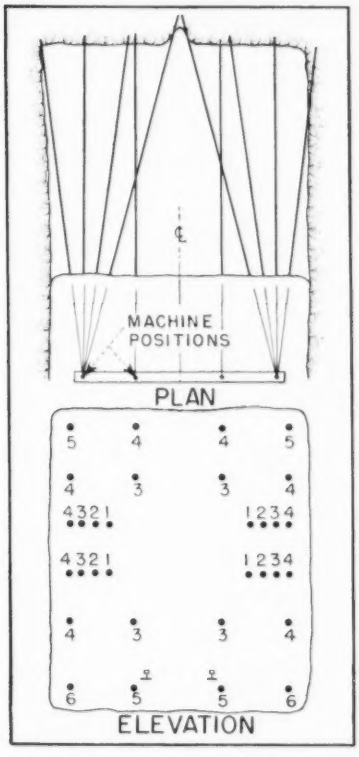
Previous hand-tramming methods employing ½-cu. yd. side-dump cars were discarded in favor of mechanical haulage. First new cars purchased were 5-ton bottom dumps

[1] Otavi Minen and Eisenbahn Gesellschaft.



PLAN OF DE WET SHAFT

NEW CONCRETE DE WET SHAFT contains steel sets, shown above. A modern man hoist, and ore hoist at this shaft will enable the company to increase the rate of ore production to about 50,000 tons per month.



SIMPLE VERTICAL V-CUT round designed especially for native workers.

which proved successful for fine muck, but later required too much time for cleaning. A 15-ton side-dump surface car of German manufacture proved satisfactory for recovering surface dumps, so a 5-ton car of similar design was built for the mine. These light-weight cars served well until twenty 60-cu. ft. Granby cars arrived. Twenty more 80-cu. ft. Granbys are on order.

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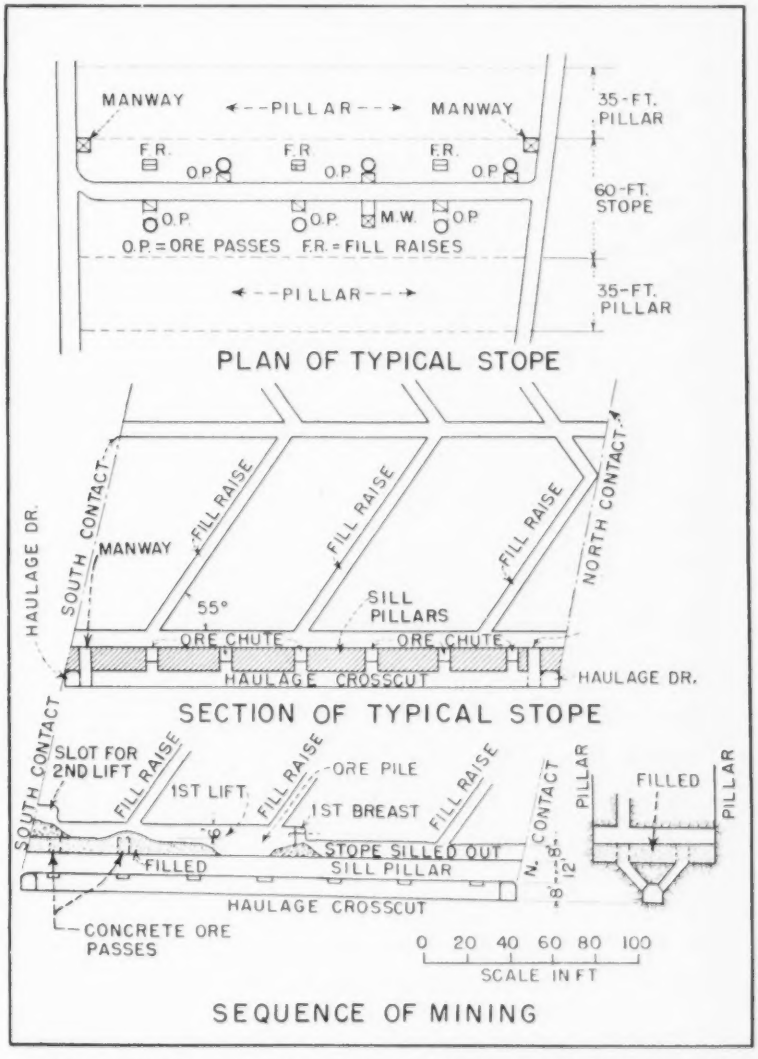
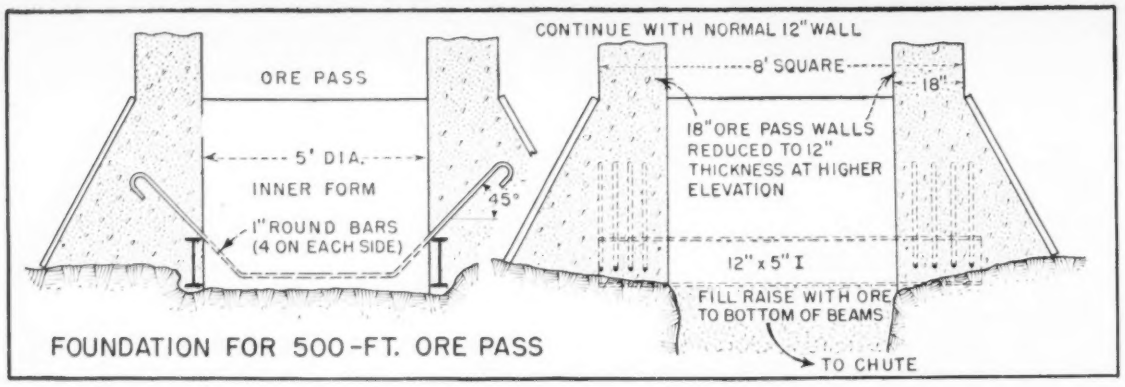


STOPE WIDTHS in new ore blocks have been increased to 60 ft. Mining method is flat-back cut-and-fill. Drills used are jackhammer feedleg types.



AFTER CONSIDERABLE EXPERIMENTAL WORK, Tsumeb found out that concrete lined ore passes were most economical. The foundation for each ore pass rests on solid rock The base is reinforced with steel.

As No. 1 and 3 internal shafts were only 1 meter between the guides, only small (12B) Eimco loaders could be used. Old ½-ton cars were replaced by 2-ton cars designed by our chief engineer. (See illustrations.)

A Goodman 6-ton battery locomotive equipped with 48 Exide MVA25's was purchased to tram all ore on the present main haulage level (1890). Later a 7-ton Ruston Hornsby diesel was acquired to serve with the Goodman. In addition six Mancha mules, and two 5-ton Greenburg battery locomotives were purchased to handle expanding production.

Development

Former operators of the Tsumeb mine used only lightweight slow-rotating jackhammers. In 1947, 3½-in. drifters, 3⅛-in. stopers, and 3-in. sinkers (all with 1-in. quarter-octagon chucks) were purchased. These were used until 1951, when tests were made with the Holman Silver Bullet lightweight jackhammer with air leg. One inch quarter-octagon and hexagon steel with tungsten-carbide bits of all types were tested. The integral chisel-type bit proved most satisfactory. Tests are now under way with ⅞-in. hexagon steel in a new lightweight air-leg jackhammer equipped with a long change. It can also be used as a substitute for a stoper.

A two-machine jumbo was tried out, but a flexible column with two automatic drifters proved more useful. To simplify drilling for native machine boys, a vertical V-cut round was developed. (See illustration.) In heavy sulphide ore three sets of cut holes are drilled, in crosscuts in waste only 24 holes are required.

How Stopes Are Planned

The previous level interval of 100 ft. required the recovery of many floor pillars—a costly procedure. Hence the first new block was planned with 166-ft. intervals. However, in order to use shaft stations previously cut, this level-sequence system was modified as follows: 170-ft., 130-ft., 100-ft., and 100-ft. This block will be mined in two units of 300 ft. and 200 ft., thus reducing the number of floor pillars from four to two. The blocks are laid out to be mined by 250-ft. lifts, with service levels 125 ft.

Former plans for mining areas provided 50-ft. stopes and 50-ft. pillars. Present plans provide 60-ft. stopes and 35-ft. pillars.

Modifying the original stoping layout proved difficult because ore passes were too small and poorly placed for the revised system. Many new ore passes had to be brought up in the footwall. Some of these were connected directly into two new main ore passes to eliminate intermediate tramming.

In the former stopes, varying from 50 to 75 ft. in length, Gardner-Denver HME two-drum air slushers were satisfactory. Later when stope lengths were increased to 150 ft., heavier 30-hp., 3-drum, electric Joy-Sullivan units were installed. In 250-ft. stopes two Joy-Sullivan units are required.

Old ore passes were made of hardwood logs radiating about a circle with butts in. Later cribbed linings were tried, but concrete linings proved to be most economical. Now all ore passes are made of concrete. They measure 5 ft. inside diameter, with 15-in. walls near the base, and 12-in. walls higher up. These ore passes are set on a reinforced base resting on a solid floor pillar. See illustration.

Previously no floor pillars were laid, and this made recovery very difficult. Several innovations were tried. Holes were drilled through broken floor pillars, and cement was injected to consolidate fill.

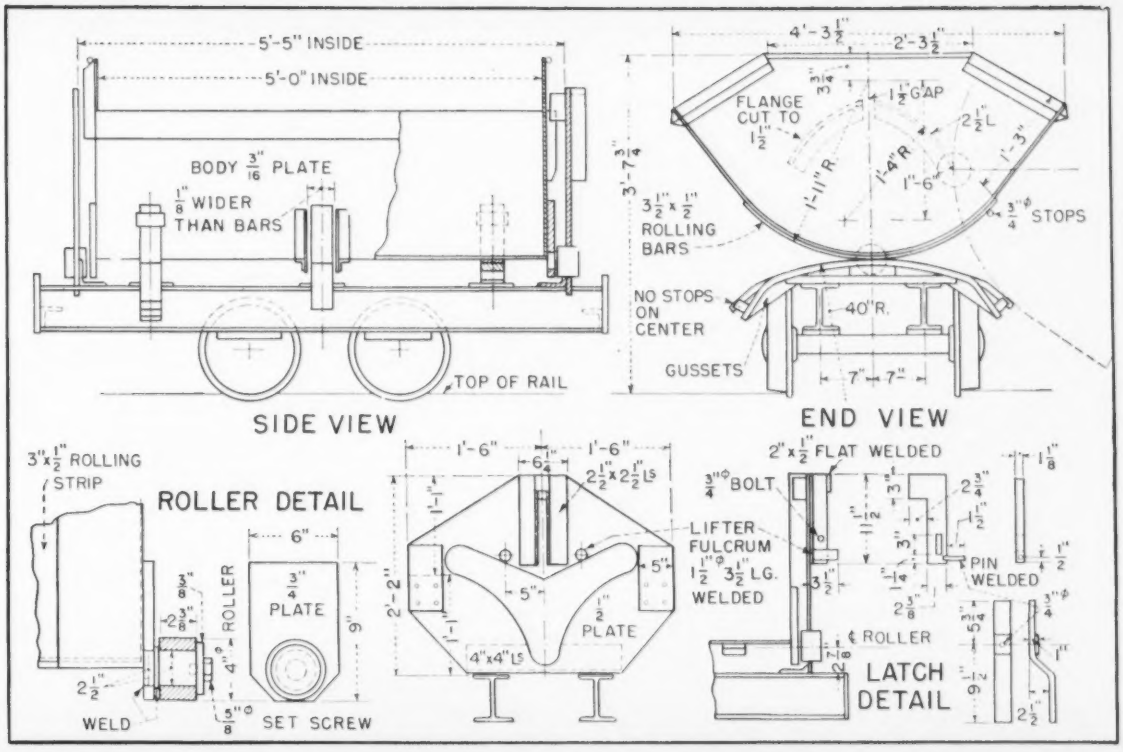
Square setting all but the last meter of ore, and top slicing the remnant has proved successful, but the final phase of ore removal has to be delayed until all ore overlying the pillar has been mined out.

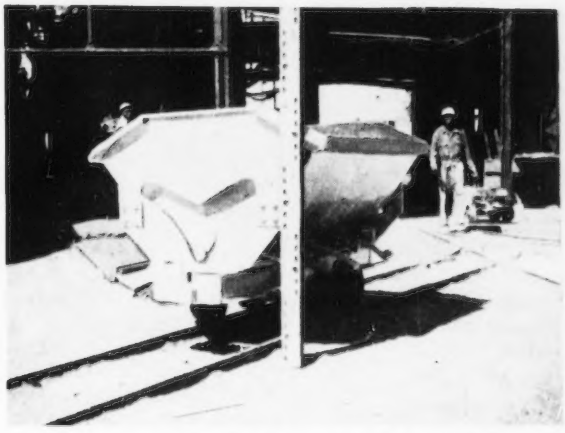
Sill floors of hardwood are now being laid. The poles are 12 to 15 ft. long, and vary from 4 to 12 in. in diameter. In one experimental stope, a concrete sill floor has been placed by working in one bag of cement to each 25 sq. ft. of filled area. It is expected that this system will prove satisfactory.

Old type drifters, mounted on cross-arms, have been replaced by light air-leg jackhammers for stope drilling. Tungsten carbide bits are used to drill out 42 8- or 12-ft. holes per round. The 8-ft. round can be drilled out by two machine boys in one shift; the 12-ft. round requires two shifts. Blasting is done with 60% dynamite and millisecond delays.

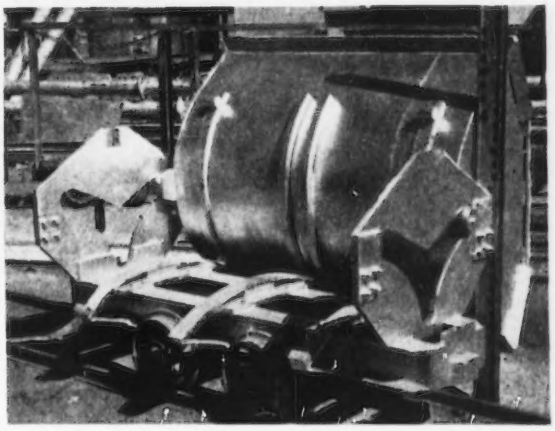
The original fill quarry was worked around the surface outcrop because the orebody has been cleaned out to the second level (186 ft. below the collar.) As this area was partially mineralized, and classed as "possible ore", a barren location north of the orebody was selected for a new waste glory hole. Since the existing fill raise is at the edge of the quarry, waste has to be transferred from the new source by a Hewitt-Robins 450-ft., 24-in. conveyor. This unit has recently been lengthened to 600 ft.

After a raise and winze had been connected, sinkers were used to break around the raise. A sub-level, 40 ft. above the conveyor was





FIVE-TON ROLLER DUMP cars built at the Tsumeb shops proved very useful during mine development stage.

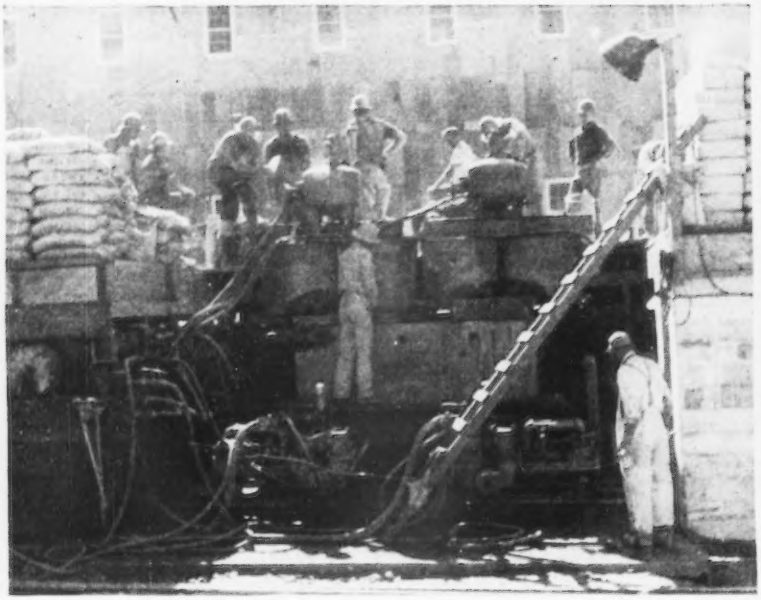


These cars are easy to clean, and easy to dump. New haulage program calls for 80-cu. ft. Granby cars.

driven to service the grizzly chambers. To enlarge the minable area, a scram system is now being developed from the sub-level. When the mine reaches a production rate of 50,000 tons per month, about 25,000 tons of fill per month will be required. As all development waste will be used to augment the fill supply, glory hole production will be about 22,000 tons per month.

European miners work on a tonnage or footage bonus. Because of the cut-and-fill method employed here, they are paid the same rate per ton of fill placed as per ton of ore mined. The fill weighs two short tons per solid cu. m.; the ore averages 3.5 short tons per cu. m. in place. Raises are paid for on a sliding scale according to the height above the level. Drifts and crosscuts are paid on a flat rate depending on size, and whether they are being driven in ore or waste.

Where pillars are being square-setted, the price is based on a single square set installed. For breaking and mucking, one and a half times the base price is paid, and the base rate for filling. This system of payment simplifies calculations in the contract office. The shaft sinking bonus was originally based on advance, but because of water troubles, and other interruptions, the bonus is now determined each month by the resident manager, mine superintendent, and master sinker. The full bonus is paid to the sinkers and timber foreman. Other men participate as follows: sinker helper, 50 to 80%; timbermen, 50 to 80%; timber helpers, 50 to 80%; banksman, 25%; hoist operator, 35%; electrician, 35%; mechanic, 35%. Native workmen are paid a flat bonus per month.



SURFACE GROUT PLANT installed near shaft to pump cement into aggregate already dumped into bottom of shaft to form water-sealing concrete plugs.

After shaft was dewatered, grout was forced into drill holes in shaft.

Grouting Solves Water Problem At Kennecott's Deep Ruth Shaft

JOHN B. HUTTL
Associate Editor
San Francisco, Calif.

IN AN *E&MJ* REPORT October, 1952, covering Kennecott Copper Corp.'s new copper projects in the Ruth-Kimberly copper district of White Pine County, Nev., mention was made of a heavy flow of water, encountered in the new Deep Ruth shaft. *E&MJ* revisited the property to find out how the problem was solved, and here are the details.

The Deep Ruth shaft is one of the major units comprising the Deep Ruth project—an undertaking designed to exploit a large porphyry orebody containing some 25-million tons of ore assaying slightly less than 1% copper by block-caving methods. It is scheduled to be sunk to 1,572 ft., with haulage levels known as D, E, and F to be established at 796 ft., 1,048 ft., and 1,375 ft. respectively, below the collar. The 7½-ft. by 32-ft. 4-in. shaft cross section is divided into a cage compartment measuring 5½ x 9 ft. inside the timbers; a counterbalance compartment 5½ ft. by 1 ft. 2 in.; two skip compartments, each 5½ x 6 ft.; and a manway, 5½ ft. by 4 ft. 10 in. Ground conditions require heavy timber sets, and these are carried close to the bottom. Dividers are of 10 x 12-in. material, and wall and end plates 12 x 12-in. timber. All shaft work is done under contract by Foley Bros., Inc.

10,000 GPM Water Flow

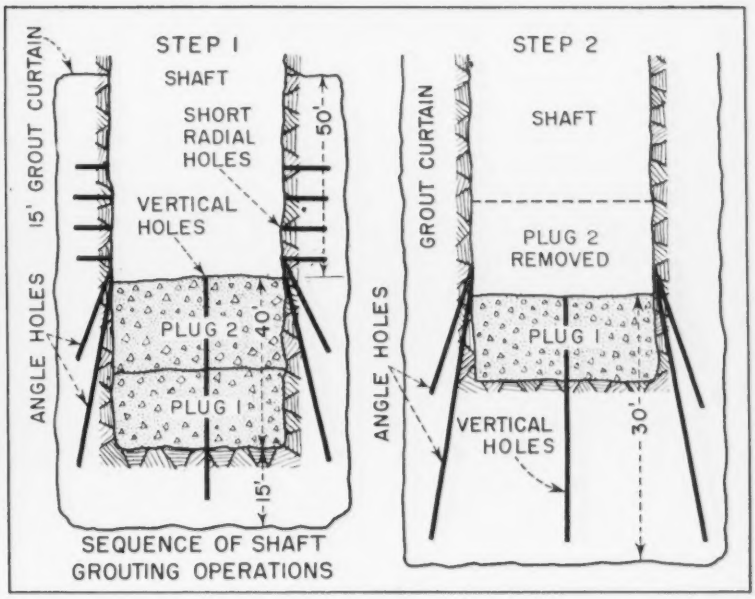
The shaft had been sunk through more than 300 ft. of limestone and 180 ft. of porphyry when the heavy flow of water was encountered at 520 ft. on May 27, 1952. Distance from this point to the natural water level is about 225 ft. Volume of the flow was estimated to be 10,000 gpm, with the water rising 175 ft. in 40 min. Save for draw down tests, all work was suspended in the shaft.

After careful study and consultation it was decided to place a concrete plug, and Intrusion Prepact, Inc., was called in to do the job. This was done by placing 19 1-in. pipes vertically at predetermined points in the shaft and filling the surrounding voids with washed aggregate to a point 18 ft. above the bottom of the shaft. The aggregate dumped by means of a bucket consisted of pieces not smaller than ¾ in. nor larger than 3 in. Grout was then pumped through the 1-in. pipes until it reached to top of the placed aggregate, and the grouted fill allowed to set for 7 days.

Next, the water column above the plug was pumped out of the shaft by centrifugal sinker pumps. The task required 3 days, proving that the plug was successful. Adjustment and repair of shaft timbers was then undertaken, followed by an attempt to install a grout curtain behind the lagging to seal off seepage above the plug. The measure proved partially successful. A second plug was placed above the first to seal the section of the shaft where it was impossible to construct the curtain. Depth of the two plugs was 40 ft. This task was completed Aug. 29, 1952, and by Sept. 3 the water was again pumped down to the top of the plug.

To strengthen the ground above the plug and reduce seepage to a minimum, a series of radial holes was drilled around the shaft for a distance of 50 ft. These were

AGITATOR AND PUMP installed at bottom of shaft to grout drill holes.



STEPS IN PROCESS: (1) Plugs 1 and 2 poured. (2) Shaft dewatered. (3) Top curtain drilled and grouted. (4) Plug 2 removed. (5) Lower curtain grouted.

progressively grouted to a depth of 15 ft. The end result was a 15-ft. grout curtain around the rectangular cross-section of the shaft.

Upon completion of this work on Sept. 11, preparations were made to drill a number of angle and vertical grout holes to extend the grout curtain established above the plug to 15 ft. below the bottom of the first plug. This phase of the operation was a sort of probing or test section. The number of holes to be drilled, their angles, and sequence of grouting was based upon the nature of the ground previously tested by drilling and the amount of water made by each hole.

The grout mixture used contained some calcium chloride to speed settling. The job was completed Oct. 28.

How Plugs Were Removed

The job of removing the 22-ft. section of the second plug was started Oct. 29 and finished on Nov. 6. No blasting was done. Material was removed with paving breakers exclusively. A drill and grout campaign similar to the one described previously was then started to extend the grout curtain to 30 ft. below the top of the first plug. This work was completed on Dec. 11. It was followed by removal of a 10-ft. section of the first plug with paving breakers and occasional light blasting. Upon completion of this operation on Dec. 18, extensive drilling and grouting operations were started preparatory to removal of the remaining section of the plug, plus 10 ft. of ground below it. Some 40 holes, 50 ft. deep, were drilled at various angles and then grouted. The job was completed Jan. 24, 1953. Removal of the remaining section of the plug and extra ground mentioned was started on Jan. 25, and completed Feb. 6. Utmost caution was exercised with this work, and only 2-ft. rounds were drilled and blasted in one shaft compartment at a time.

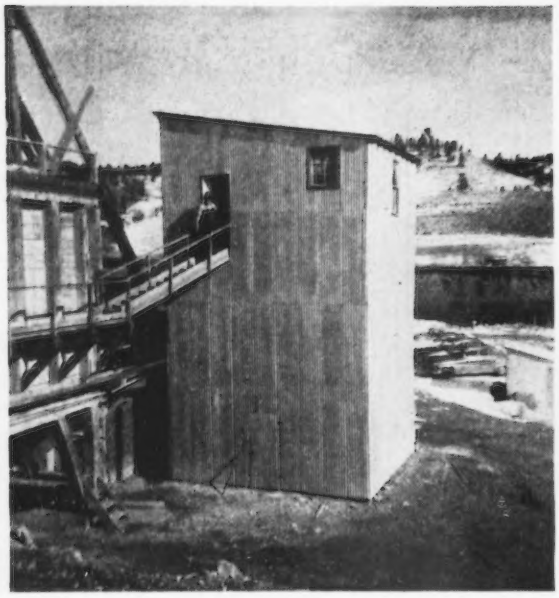
Sinking Resumed

Prevailing ground condition indicated that sinking operations could be resumed. Accordingly, a new drill pattern consisting of some 50 holes, 50 ft. deep, drilled at predetermined angles and vertical, followed by grouting operations, was tested to determine the method of operation for succeeding lifts. The operations were completed Feb. 28, and results were quite satisfactory. In fact, some 15 ft. of ground was removed in the shaft by March 13. The drill pattern and grout cycle are being repeated, with holes being drilled deeper as ground conditions improve. On May 1, the shaft had reached a depth of 560 ft.

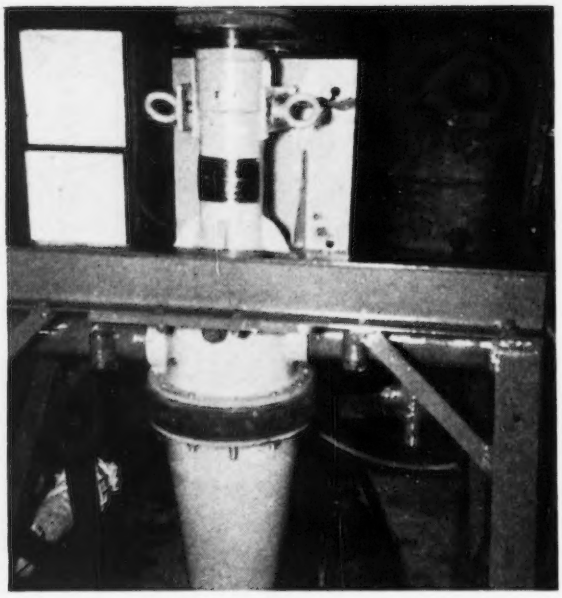
Equipment

Save for test drilling, all grout holes were drilled with percussion drills designed for long-hole drilling. Tungsten-carbide insert bits were employed. Hole sizes varied from 1 in. to 2½ in., depending on the ultimate depth of the hole. The grout mixture was injected into the holes by standard packers, although some direct grouting into 3-in. pipe casing was introduced at times. Grout mix was composed of cement, fly ash, and "Intrusion Aid", a patented mixture which deters settling. Proportions varied according to the nature of the ground to be grouted. The air-operated grout pumps employed were G-D units modified for high-pressure use. The grout plant on the surface consisted of a materials storage platform; a battery of mixers; agitator tank; and two grout pumps. Pumps delivered the prepared grout to an agitator and grout pump installed close to the grouting site underground. Grout pressures varied from 50 to 500 lb., depending on the character of the ground penetrated by the various drill holes.

E&MJ expresses its thanks to J. C. Kinnear, Jr., general manager, Nevada Mines Division, Kennecott Copper Corp., for permission to publish this article; also to Paul Hett, assistant general manager, S. W. Smith, general superintendent of mines, and A. A. Blakewell Jr., mines project engineer, for their assistance in the preparation of this article on effective grouting methods used at Deep Ruth shaft.



SAND PREPARATION PLANT near headframe houses a 15x16-ft. tank fitted with mechanical agitators.



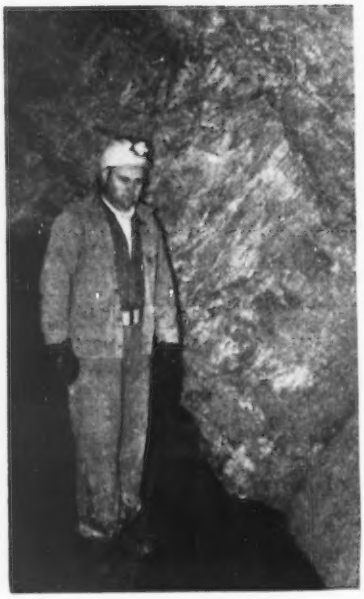
CENTRICLONE CLASSIFIER treats mill tailings to produce a low-slime, high-sand pulp for mine fill.

Knob Hill Sand-Fill System Combats Heavy, Blocky Ground

KNOB HILL MINE, important gold-silver producer, near Republic, Wash. has developed the successful sand-fill technique described in this article. It has been employed since 1951, and became necessary after the company abandoned open-cut mining in favor of more selective underground methods. This switch has also been more economical.

One of the serious problem encountered in this change was that of ground support. This was due to the occurrence of ore in silicified andesitic rock walls, high in feldspar content, which slake quickly when exposed to air and moisture. Rapid kaolinization resulted in talcy, blocky, heavy ground. Stress adjustments occurring after introduction of quartz vein filling resulted in movement along vein walls, and in cross-faulting and brecciation of vein quartz. All of this has resulted in weak ore and rock masses.

As the mine grew deeper, vein thickness decreased. However this narrowing resulted in a greater length of mineable values which offset the narrower width. The principal effect of the narrowing veins has been a switch to cut-and-fill methods to replace previous square-set stoping methods. Procurement of fill has accordingly been a paramount problem.



A. R. PATTERSON, Author
General Superintendent
Knob Hill Mines, Inc.
Republic, Wash.

Several sources of fill including development waste were used, but these proved inadequate; and in 1950 mechanical means of treating mills tailing were tried. In April, 1951, a full-scale preparation plant was completed, and this has proven to be a successful source of fill.

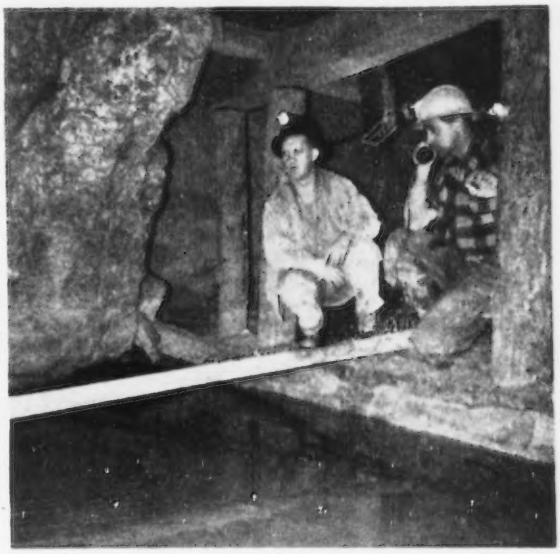
After availability of fill was established, cut-and-fill stoping methods were modified to take full advantage of the greater flexibility offered by the new fill supply. All stopes along the South cross-vein are laid out in panels 150-ft. long, three times the length of former waste fill stopes. Save for a single chute 75 ft. on each side, serving as an auxiliary ore pass for two stopes, a three-compartment timbered raise from the haulage level serves the entire stope. The relative ease with which broken ore can be scraped from either wing of a stope has made it possible to install fewer chutes and raises.

Stopers have proven preferable to drifters for mining present ore blocks. In practice, two miners drill

MINERS LAG OFF stope ends in preparation for sand fill. Note use of air-powered mechanical wood saw.

NEXT, BURLAP SACKS are attached to the lagging. Bostich H-4 stapling hammers speed the job.

BOTH ENDS OF SACK-COVERED bulkheads are grouted to walls with mixture of sand and quick-setting cement.



ORDERS TO SEND DOWN FILL are telephoned to top man by L. E. Kells. Mine Superintendent J. Davis (left).

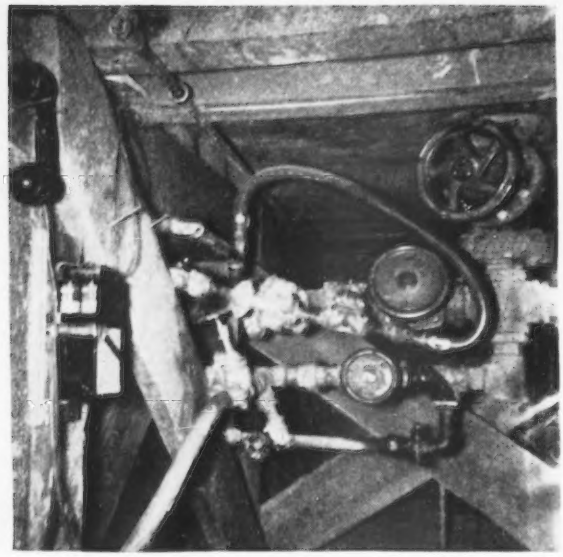
and blast two full-length cuts (57 ft.) in a one-half stope; scrape out the broken ore; and complete timbering of stope ends while sand is poured in the other half.

The complete mining cycle takes longer than filling, and as a consequence several stopes may be filled in rotation without breaking the routine in any one. Two cuts are taken across the back of a stope to decrease by one the number of cleanups necessary in a given cycle.

Ore is blasted directly onto the fill—no timbered stope floors are necessary. A light cut of sand during final cleanup recovers all of the ore, and the amount of sand contained in the bulk of the ore is entirely negligible.

After broken ore has been removed from a panel the miners complete their contract by doing a certain amount of timbering. Since the central three-compartment raise has been taken through to the level above and timbered on 5-ft. vertical centers, it is a simple matter for the miners to nail up the 2-in. rough fir planking forming the bulkhead to impound the fill. A cap must be placed at the stope end at a height matching that of the raise timbering, and 2-in. plank lagging applied. Lagging comes in random widths varying from 8 to 12 in., but is all precut to 5-ft. lengths. Plank is secured to caps with but a single 30d nail top and bottom, and to provide for drainage there is a ½-in. space between each plank.

Filter medium consisting of burlap is applied by the sand fill crew (generally two men). Good used burlap sacks are purchased specifically for this work. Current price for sacks is 16¢, although cost has been as high as 25¢. The sacks are ripped open by pulling out the lockstitching, and then tacked to the plank with a Bostitch H-4 stapling



SAND FILL IS SENT DOWN FROM SURFACE from this station equipped with telephone and control valves.

Typical Analysis of Centriclone Classifier Feed and Products

Material	Mesh	Percent		Cum. %	Approx Density
Feed	+ 65	4.4			
	+100	9.9	+200	34.6	35-40%
	+200	20.3			
	−200	65.4	−200	65.4	
				100.0	
Overflow	200	2.3			17-21%
	200	97.7			
Underflow	65	8.4			
	100	22.6			
	150	28.7	+200	72.7	
	200	13.0			
	325	15.2			
	400	1.8			
	400 sand	6.6	−200	27.3	72-75%
	400 slime	3.7			
		100.0			

CENTRICLONE CLASSIFIER increases plus 200-mesh contents of sand fill product to 72.7%.

hammer. This device is fast and very convenient in that only one hand need be used for tacking. It was found that by welding a few ounces weight on the head of the stapler the staples could be driven the full depth on the first blow.

Considerable care is taken to fit the planking close to the contour of the walls. After the burlap has been tacked into place a grout of Hi-Early cement mixed in proportion of 1-to-1 with sand and of rather stiff consistency is applied liberally along both footwall and hanging wall edges of the bulkhead to insure a perfect seal of the burlap and the walls. This grout is allowed to set up overnight, but on occasions sand has been poured against fresh grouting if it was certain that no blasting would occur during the particular shift. Virtually no leakage of sand has occurred since grouting supplanted caulking with burlap strips as standard practice. Complete preparation of a stope panel from lagging to grouting generally requires 4 hr. or less, and normal routine for the filling crew consists of a pour in the forenoon and preparation of another panel at another site in the afternoon.

Preparations for a pour are completed by making the necessary connections along the sand transmission line and communications circuit. A pipe sweep rather than an elbow is used to direct the line down a particular raise and into the stope to be filled. No valves are used in the transmission line, so takeoffs must be made by breaking the piping and connecting the appropriate sweep. Save for a short run below the collar of the shaft all piping is 2-in. standard pipe grooved for Victaulic couplings. Plain end pipe, cut to lengths of either 10 ft. or 20 ft., is purchased whenever possible and grooved in the company's machine shop. The standard lengths permit easier handling underground.

Telephones Required

Communication between the filling crew and the top man handling the control valves at the preparation plant is important. The installation used consists of surplus Signal Corps telephones and Signal Corps wire. Self-contained within a heavy leather case with shoulder strap, the EE-8 telephones are easily carried from stope to stope. The two-conductor wire is light, strong and inexpensive. However, a more sturdy permanent telephone line has been carried through the shaft. It consists of 18-2 portable rubber-covered cord, and connects with the laterals on each level through a junction box and disconnect switch. The line is independent of the main mine telephone system.

The top man who handles the sand valves as directed by the crew leader generally is one of two regular men doing timber framing. He is advised in advance when sand will be required in the mine and will be at the topside telephone at the time specified. Once word has been given to start the flow of sand, a simple routine is followed as a precaution, requiring but a minute or two, after which sand is on its way down the mine. The measure consists of admitting a small quantity of water to the sand line and then applying for a moment the full pressure of the mine air supply to the line. Unless the sand line is plugged or broken the air and water will reach the discharge end of the line in a matter of seconds. When this happens the sand man advises his top man to turn sand into the line. As the preparation plant is near the collar of the shaft, and the first ell some 600 ft. vertically below the the plant, little trouble is encountered in transmitting the relatively clean sand. If sand flow is interrupted, the air and water treatment mentioned is given immediately, thereby clearing the line for resumption of pouring at a moment's notice. Unless troublesome leaks occur in a stope, the sand flow is seldom interrupted until the stope either is filled or the sand tank is emptied. Leaks which develop in a stope are plugged with paper chemical bags discarded by the mill.

A practice giving excellent fills but one not always possible to utilize is that of pouring by easy stages in two or more stopes. When a full day of draining can be allowed before resumption of filling operations, the initial compactness of a newly completed lift is very high. Obversely, occasions have arisen when a stope had to be filled without delay so that mining might be resumed at once, and there has been

no difficulty beyond the fact that a footboard was required to support the feed piston of the drills.

In placing sand in a stope, a horizontal length of pipe directs the sand away from the immediate vicinity of the bulkhead and usually toward the hanging wall. As a consequence, turbulence along the filter surface is avoided, and because of natural classification the coarser sand fractions tend to build higher along the hanging wall where there is the greatest possibility of leaks through fractures and where the ground requires the most support. Under normal conditions the storage capacity of 100 dry tons is placed in about 3 hr. A larger transmission line would permit a more rapid flow, although the belief prevails at Knob Hill that closer control is possible with a reduced rate of flow.

The sand preparation plant is near the collar of the shaft. The site was selected with a view of eliminating any horizontal sand lines until velocity had been established in the line. This also diminishes the possibility of freezing during the severe part of the winter season. The 15 x 16-ft. agitator was erected on heavy timber bents 4 ft. above ground line to permit access to discharge controls. The bents are set on solid rock, and a concrete floor sloping to a drain and surrounded by a low curb covers the entire area under the tank. This unit and auxiliaries are housed in a fire-proof structure heated from beneath the tank with a steam unit heater.

Agitator Prevents Setting

The agitator is of the Devereaux type. A 25-hp. line-start induction motor drives a 38-in., 4-blade, downthrust propeller at a speed of 165 rpm. Inasmuch as intensive agitation is needed only at the time sand is to be taken into the mine, the propeller is used only for short periods, being started a few minutes before start of sand flow and stopped when the pulp level reaches the horizon of the propeller.

To preclude the possibility of the sand mass becoming set in the tank, gentle agitation is provided by air. About 65 cfm of air at 20 psi is distributed through the pulp from 8 jets spaced equidistantly around the periphery of the tank just above the bottom. Control of the air flow is by needle valves arranged conveniently on the top deck of the agitator. Backflow of pulp into air lines is eliminated by use of rubber checks at the tips of the nozzles.

The gentle agitation maintained continuously keeps the entire mass in a state of semi-suspension, thereby decreasing the duty on the agitator mechanism. Air lines are so valved that the main mine supply at 100 psi may be utilized in the event that more violent agitation by air is required. Discharge of sand is effected at the center of the tank bottom through a 4-in. valve with rubber diaphragm. The transmission line is immediately reduced to 3 in., and a 3-in. valve in the line provides a second shut-off. A second 3-in. line similarly valved provides means of wasting the tank contents should need arise. Through suitable valving, provision has been made to introduce air or water into the transmission line or into the tank through the main discharge valve. Use of high-pressure air in the sand line has proven a satisfactory means of clearing the line. In addition, excessive water underground is also avoided.

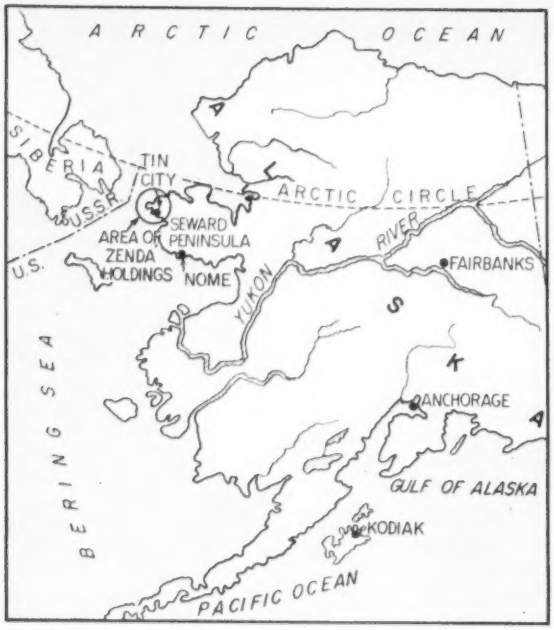
Fill Consists of Tailings

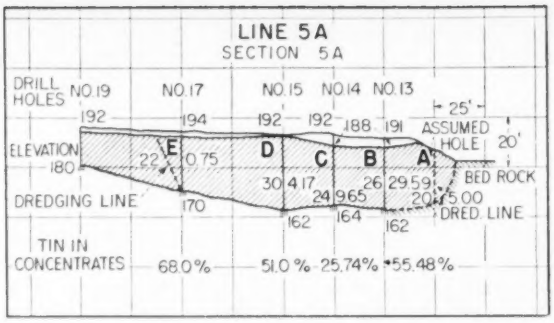
To insure satisfactory operation of any hydraulic fill method, an adequate supply of raw material must be maintained, preferably one of low cost. At Knob Hill, as at most other mining operations, the logical source of material is tailing from the mill. In view of the fact that mill tailing in most instances must be pumped to a disposal site, the only additional cost involved in obtaining mine fill is in actual preparation of the material. In the investigation carried out in 1950 mentioned previously to find an effective method for sand-slime separation, attention was directed to a wet cyclonic separator combining the properties of both the centrifuge and cyclone and known as the Centriclone classifier. At the time this unit had never been used for the purpose to which it was eventually put at Knob Hill, but repeated tests indicated that it would definitely fit into the scheme of things. As a consequence, a 10-in. machine was purchased and installed early in 1951. The results obtained during 2 yr. of operation have fully come up to expectations. The unit has been redesigned to some extent, with rubber wearing parts substituted for the original metal design. It is equipped with a 7½-hp. motor driving the impeller at 1650 rpm. The rotor orifice is set at 2 in., and the cone discharge valve at 1 in. Typical feed and product size distribution are shown in the accompanying table. The mill tailings are pumped at low head to the Centriclone classifier by the sand pumps used previously for directing them to the impound area and classification occurs instantly, with resultant products being expelled at two points. The low gravity fractions, including most of the water contained in the feed, leave the machine through the hollow rotor and flow to the tailings dam via a 4-in line, while the granular fraction is discharged through the small end of the cone at an average density of 75% and falls directly into the agitator tank. Sufficient fine sand is present to keep pulp of this density surprisingly fluid, and the high solids ratio is very desirable under certain filling conditions. When thick sand is not a factor, water is frequently added at the tank discharge to speed pouring operations.

Method Cuts Costs

The complete sand preparation plant, including housing and the first 1,500 ft. of sand transmission line, represents an investment of about $9,000. The per ton cost of operation in 1952, with 15,132 tons of sand placed in stopes, was as follows: Labor, $0.40; supplies, $0.14; and power, $0.07; or a total of $0.61. The cost of sand filling in terms of tons milled was $0.18 for the same period. As compared to waste filling, the saving made is about $0.15 per ton milled, sufficient to very nearly amortize the preparation on 1 yr. of operation. Other potential reductions in costs will gradually manifest themselves—drastically revised mining methods as a case in point, or saving of manpower directly chargeable to filling at a time when this precious commodity cannot always be purchased. Rapidity with which filling may be accomplished results in fewer men being needed on production, leaving more to do development work.

The author wishes to express his thanks to the personnel of other operations who gave generously of their knowledge of the problems involved, and to the owners of Knob Hill Mines for permission to relate our experiences. Credit for the installation and successful operation of the filling facilities described is due entirely to the fine cooperation between department heads: Elmo Blain, shop superintendent; Louis Lembeck, mill superintendent; Tom Pittman, chief enginer; and James Davis, mine superintendent of Knob Hill.





CAPE CREEK sample (above) holes show high grade deposits with little overburden. For example, Hole No. 15 (30 4.17) indicates 4.17 lbs. tin per cu. yd. average for 30 ft. depth.

Zenda Placers Tin In Russia's Shadow

GROWING IMPORTANCE of tin deposit workings in Alaska is reflected in a report just received from the Zenda Gold Mining Co.

On Seward Peninsula, only a few miles across Bering Strait from Siberia, Zenda is drilling with a view to large scale placer operations.

Both lode and placer deposits of tin are found on Seward Peninsula, the only United States soil where important production of cassiterite has yet been achieved.

Discovery of two tin-bearing veins in the western part of the Peninsula was announced in 1945 by the U. S. Geological Survey. Tin-bearing deposits had been investigated in the Cape Mountain and Lost River areas in 1943-44 by USGS and the Bureau of Mines.

The tense atmosphere in Asia, fear of interruption of supplies, events in Korea and national stockpiling placed a special value on tin in 1950. Any source of tin where accessibility was assured loomed in importance.

Domestic mine production of tin in concentrates was 94.1 long tons in 1950 compared with 68.4 tons in 1949. Most of the output was obtained from placer deposits in Alaska. Figuring largely in this output were the United States Tin Corp. and the Northern Tin Co., both operating in Seward Peninsula's Cape Mountain District.

In 1951, Zenda acquired leases on two creeks in the Cape Mountain District. These leases had been drilled by the Bureau of Mines. Zenda made preparations to start drilling, backed by a DMEA loan. Drilling has now been underway two seasons.

Control of two other creeks has been acquired with a fifth creek under option to Zenda, pending completion of current drilling. Several placer claims have been located by Zenda and investigation of a lode deposit is underway.

Cape Mountain Formation

The formation in the Cape Mountain tin bearing district is limestone intruded by granite. Cape Mountain itself is a dome-shaped granite intrusion some three miles in diameter, contacting the intruded limestone and in places submerging blocks of limestone while it was in a molten state.

Along the contact of granite and limestone, contact metamorphic minerals such as wollastonite, pyroxene, tourmaline and other minerals are found. Hot tin bearing solutions derived from the granite deposited cassiterite in the limestone at or near the contact and occasionally in the border granite.

Placers are found along the present creek beds, partly in the channel and sometimes as benches and bars. One deep, ancient channel has been located. Several claims have been staked by Zenda along the beach near Tin City as they indicate a fair tin content in gravels not frozen and that probably can be dredged at a profit.

Cape Creek and its branch, First Chance Creek, were drilled in 1952 and showed an excellent average grade of gravel—over 4 lbs. per cubic yard for an estimated 876,450 yards. During the 1953 season, drilling has been confined to Boulder Creek, with complete results not yet available. Plans are set for drilling three other creeks. More than a half million pounds of tin reportedly have been proven thus far in gravels which appear suitable for bucket-line dredging.

Gravels in most of the ground tested are completely frozen and usually are covered with tundra and moss, below which there is mixed muck and ice. Stripping and hydraulicking with cold water to remove overburden will be necessary.

Underlying gravels on Cape Creek, when thawed, will be hauled by carryalls to a central washing and jigging plant for recovery of the cassiterite in a high grade concentrate. The concentrate will be cleaned and shipped by steamer to Texas City for smelting. Concentrate reportedly will boast 60-70% tin, as cassiterite.

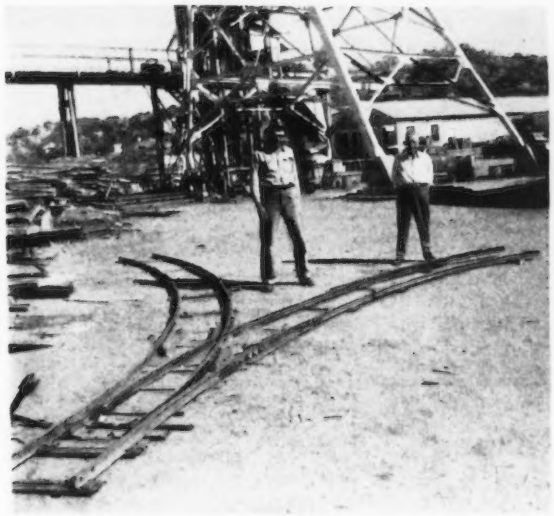
B. M. Snyder, Zenda vice president, seated in Zenda's offices in Seattle's Securities Building, explained that "This tin project was brought to the attention of Zenda's J. U. M. Troy in 1951 by an engineer in the employ of Morrison-Knudsen's Alaska Division."

With a note of pride, Snyder said that "Zenda is pioneering in the district with a view to large scale placer operations, which have

(Continued on page 190)

OPERATING IDEAS

A Pre-Fabricated Track Turnout



SEVERE WATER CONDITIONS in the mine of St. Anthony Mining and Development Co., Tiger, Ariz., prevented mine crews from installing a track turnout with conventional steel ties on one level. Accordingly Earl Snodgrass, master mechanic (left foreground) designed and built the prefabricated turnout illustrated.

Except for the standard switch throw, all parts including the frog were built in the company shop. The frog and its guard rails are mounted on ¼-in. plate, with a second plate holding the switch points and throw.

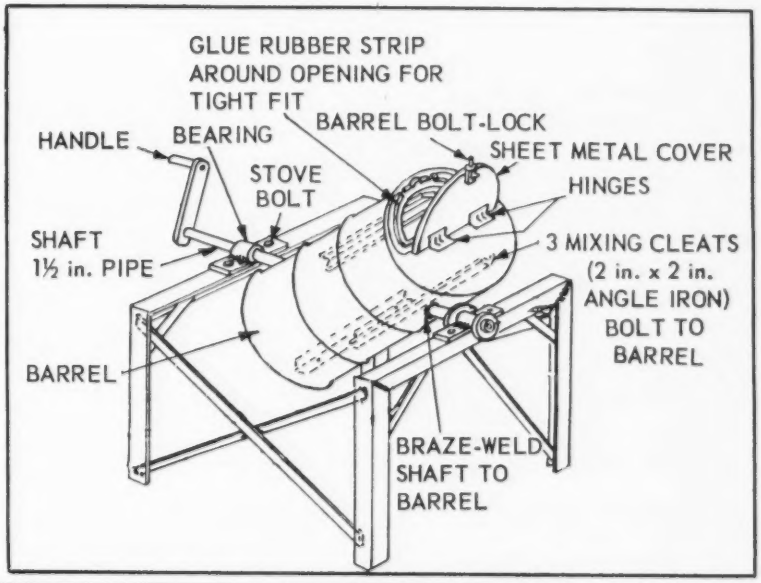
All parts were designed to pass through a small shaft compartment. For easy handling, rails were cut into 10-ft. sections. Curved slide rails were provided (at right) to advance mucking machines to a newly driven face.

Note: Since this idea was submitted, some time ago, the St. Anthony property has been acquired by the adjacent San Manuel Copper Corp. Jack Richards, former manager of the property widely known in western mining circles, is shown at right.

Dry Reagent Mixer

AN OLD OIL DRUM CAN be converted into a dry reagent mixer as shown in this all-welded unit. Two short shafts are braze-welded to the drum and mounted on built-up bearings consisting of strap steel and short pieces of old pipe. The bearings in turn are bolted to an all welded steel frame. A hinged cover fitted with a bolt lock enables operators to pour dry mill reagents into the drum. Rotation of the drum by means of a crank on one of the shafts creates the necessary tumbling action within the drum required to mix dry reagents.

One word of caution—before welding or burning parts of drum be sure that all inflammable materials have been cleaned out. Idea, courtesy Linde TIPS.



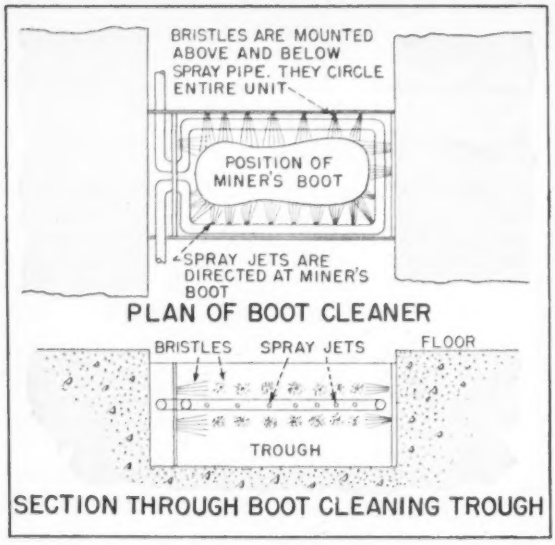
An Easy Way to Drill Glass

THE PROBLEM OF admitting high-voltage lines of small gage into an electrical repair shop can sometimes be solved by running the lines right through window glass which is an excellent insulating medium.

The technique of drilling the glass is described by Paul C. Ziemke of Oak Ridge, Tenn. For holes of medium or large size, use brass or copper tubing of outside diameter of the opening desired. Chuck the tube in an electrically-powered hole shooter and develop a peripheral speed of 100 fpm. Use 80 to 100-grit carborundum in combination with light machine oil as an abrasive. Feed this abrasive under the improvised drill bit with a small feather tip so as not to mar the glass surface. Back up the work with a rubber pad slightly larger than the hole, and do not drill all the way through. Reverse the sheet and complete the job from the other side.

For small holes use a solid rod of proper size, or chuck a three-cornered file in a drill operating at 1800 rpm. In this case use a mixture of turpentine and camphor as a lubricant. Holes up to ½-in. in diameter can be drilled in glass using a flat drill hardened in sulphurous acid. To insure alignment of holes, use plywood clamped over glass as a template.

Boot Cleaning Device


BRISTLES ARE MOUNTED ABOVE AND BELOW SPRAY PIPE. THEY CIRCLE ENTIRE UNIT
POSITION OF MINER'S BOOT
SPRAY JETS ARE DIRECTED AT MINER'S BOOT
PLAN OF BOOT CLEANER
BRISTLES
SPRAY JETS
FLOOR
TROUGH
SECTION THROUGH BOOT CLEANING TROUGH

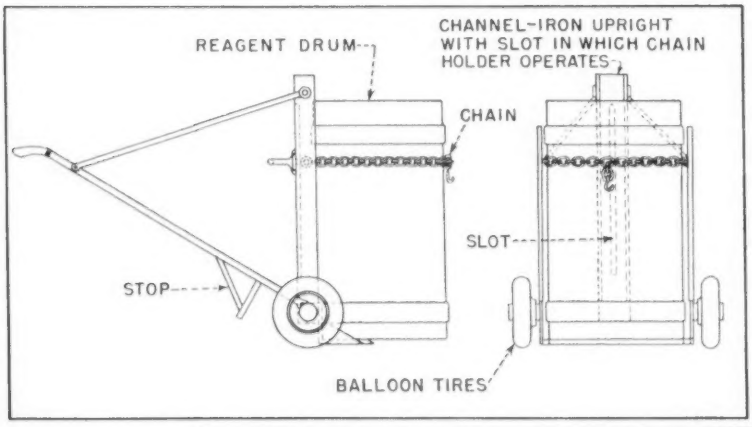
ONE OF THE difficult problems of mine dry attendants is that of keeping mud out of the locker rooms. Most of it is dragged into the change rooms on the boots of miners who are always in a hurry to get out of their "diggers" at quitting time, and change to street clothes.

Any type of boot cleaner will have to be fast and convenient—and that aptly describes the boot cleaning bath devised by the staff of Fosdalens Bergverks A/K at Malm, Norway. The unit consists of a pipe bent into a roughly rectangular shape to encompass a mine boot. The pipe is pierced with numerous holes through which spray jets are trained toward the central area. Bristles are mounted above and below this pipe as shown.

All the miner has to do when he comes off shift is to turn on the spray, raise and lower his boot a few times, and he is ready to enter the mine dry with clean boots.

This idea was submitted by C. C. Austin, author of other Scandinavian mining articles.

Hand Truck Moves Oil and Reagent Drums Easily and Safely



TRANSPORTATION OF OIL drums at the diesel power plant and drums containing reagents at the concentrator of a western lead-zinc mine has been expedited by use of the light hand truck shown. It is of simple construction, foldable for easy transfer and storage. Drums and other circular objects are held securely to the channel-iron upright welded to the two-wheel truck by a quick-locking and adjustable chain assembly consisting of two lengths of steel chain with lock attached to a steel holder with handle operating in the slot in the upright. Weight distribution is such that the drum is hardly tipped from the vertical. The balloon tires provide enough bearing area to permit smooth operation in areas surfaced with gravel.

Truck-Mounted Cable Reel Saves Labor, Protects Cable

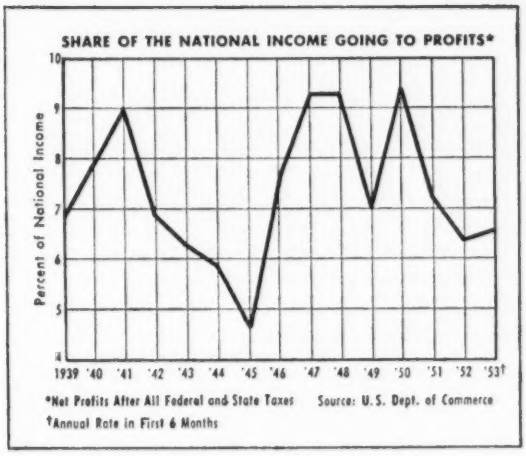
HANDLING UP TO 10,000 FT of power cable in one shift with a two-man crew and longer cable life are chief benefits derived from a truck-mounted hydraulic cable reel used at strip mines of the Hanna Coal Co., division of Pittsburgh Consolidation Coal Co.

A two-man crew does the same work that five or six men formerly did with the aid of a bulldozer. Not only is the work done easier and faster with smaller crew, but also the cable can be moved to a new location and made ready for use in a much shorter time.

A conventional oil pump used with a truck hydraulic hoist is the source of oil pressure that drives a hydraulic motor powering the unit. Direction of rotation is controlled by a system of valves. A wide roller mounted at the rear of and nearly flush with the truck bed protects the cable as it is wound on the reel. Cables have longer life because they are not subjected to as much abrasive action or cutting as previously and there is little or no twisting or kinking. Published through courtesy *Coal Age*.

The first of two articles on profits

PROFITS...How High Are They?


SHARE OF THE NATIONAL INCOME GOING TO PROFITS*
Percent of National Income
10
9
8
7
6
5
4
1939 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52 '53†
*Net Profits After All Federal and State Taxes
†Annual Rate in First 6 Months
Source: U.S. Dept. of Commerce

How high are profits? What is being done with them? This is the first of two articles designed solely to throw some factual light on these key economic questions.

One of the important economic developments of 1953 has been a substantial increase in the dollar volume of corporation profits from the level of 1952. But to answer the question "How high are profits?" we must also measure them: 1) by comparison with the record of previous years, and 2) as a share of the total national income. The term "profits," as used here, refers to profits *after taxes.* These are the only profits that can be paid to stockholders or retained for use in the business.

In the first six months of 1953, corporate profits *after taxes* were at an annual rate of $20.4 billion. This was higher than in the first half of 1952, but lower than in the full years 1948 or 1950, or in the first half of 1951. If allowance is made for the declining value of the dollar, this year's net profits for all corporations represent less purchasing power than those made five or six years ago.

Here is the record of profits over the years:

	Net Profits After Taxes of All U. S. Corporations	
	Billions of Dollars	
	Actual	In 1953 Prices
1929	8.4	14.6
1939	5.0	9.8
1947	18.5	22.1
1948	20.7	22.7
1949	16.3	18.3
1950	22.7	24.6
1951	20.1	19.7
1952	18.6	18.7
1953*	20.4	20.4

*Annual rate, first six months

The record shows that real profits have a little more than doubled since 1939. This increase, however, does not mean that corporations are doing exceptionally well. The entire national income has doubled since 1939. And our industrial plant is more than twice as large as it was in 1939. Therefore, profits have just about kept pace with industrial growth.

Return on Investment

How high are profits compared with sales, or compared with the stockholders' investment?

What is the rate of return to the people who have invested their savings in corporate business?

The table below shows that for the past three years the rate of return on both sales and investment has been substantially below the return achieved in earlier postwar years. The rate of return on stockholders' investment is higher now than it was in 1939. But this is primarily because today's profits are reported in terms of today's prices, whereas much of the investment in plant facilities is still carried on the books at prewar prices, which are substantially below the cost of replacement. The current rate of return, measured as a percentage of total corporate sales, is below prewar levels.

	Corporate Profits After Taxes	
	Per Cent of Total Sales	Per Cent of Stockholders' Equity *
1929	6.1	NA
1939	4.1	4.0
1947	5.3	
1948	5.3	14.8 average
1949	4.4	
1950	5.3	
1951	4.1	11.8
1952	3.6	10.3
1953#	3.7	10.8

* Manufacturing corporations only
NA Not available
Annual rate, first six months

In considering these figures, it should be remembered that they are averages for all corporations. Some companies make more than the average, and many make no profit at all. In every year since 1915 at least 25% of all corporations have operated at a loss. In 1939, 58% of all corporations were losing money. This year the figure will probably be at least 30%. The improvement since 1939 shows a much healthier economy. But it does not indicate that profits are easy to make.

How Big a Share of the Pie?

The most important single fact about profits is that they now represent a *smaller* share of national income than they have in past years of normal prosperity. For the past three years, profits have taken a smaller share of the pie than in 1939, and considerably smaller than in the early postwar years. Here, as the chart at the beginning shows, is the record:

	Corporate Profits After Taxes as a Percentage of National Income
1929	9.6
1939	6.9
1947	9.3
1948	9.3
1949	7.5
1950	9.4
1951	7.2
1952	6.4
1953*	6.6

*Annual rate, first six months

The main reason for the declining corporate share of national income is, of course, the increasing share taken by the federal government in the form of taxes. The wage earners' share is also higher than in 1939. But the really startling increase is in federal taxes. Taxes on profits now equal almost 8% of the national income, compared to only 2% in 1939.

Why This Is Important

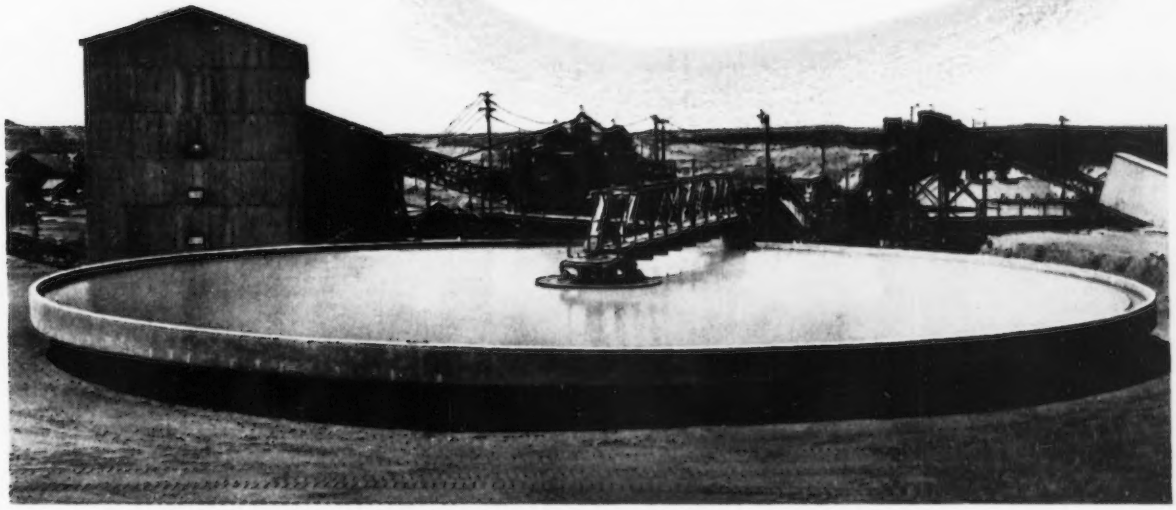
It is important that these facts about profits and taxes be widely understood. At its next session, Congress must consider what to do about the emergency taxes on profits enacted after the outbreak of the Korean War. The so-called excess profits tax is scheduled to die on January 1, 1954. In the absence of new legislation, the rate of the corporate income tax will drop from 52% to 47% on April 1. Many factors, including the revenue needs of the government, must enter into the decision whether or not to reduce taxes. But one fact stands out clearly: By comparison either with past years or with the total national income, corporate profits today are relatively low.

* * *

The second article in this series will discuss what corporations do with their profits.

McGraw-Hill Publishing Company, Inc.

the DORR 4-Arm Torq Thickener



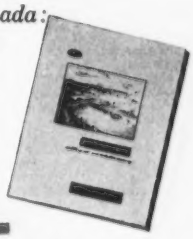
This 130' dia., heavy duty 4-Arm Dorr Torq Thickener is in operation at one of the Mesabi Range properties of Jones and Laughlin Steel Corporation. It is thickening 100 long tons per hour of minus 150 mesh iron ore tailings. Solids content in the feed averages 12% solids and Thickener underflow contains approximately 33% solids. Thickener overflow is returned to the mill water supply.

New Mesabi Range Installation Handles 100 tons per hour of Iron Ore Tailings

When your problem is to simplify the handling of heavy ore tailings, the Dorr 4-Arm Torq Thickener may be exactly the answer you need.

Two long arms rake only the outer section of the tank floor. Two short arms take over the load in the inner section, raking all solids to a conventional centercone discharge. All 4 arms are provided with the exclusive Dorr Torq feature which reduces overload by continuous raking action, without the danger of stalling and damage to the unit.

For more information about the advantage of the 4-Arm Torq and the complete Dorr Thickener line, write for a copy of Bulletin No. 3001. THE DORR COMPANY, Stamford, Conn. *In Canada:* 26 St. Clair Avenue, E., Toronto 5.



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 (*Continued from page 69*)

U.S. Slab Zinc Statistics

The sharp increase in slab zinc stocks at U.S. smelters (primary and secondary) has depressed the price to the point where forced curtailment in output is taking place. Until production and consumption are brought into balance, consumers can be expected to pursue a hand-to-mouth policy in purchasing the metal. The most recent statistics of the American Zinc Institute follow, figures in tons:

		Shipments				
	Production	Domestic	Export-Drawback	Gov't Acct'	Total	Stock at End
1946	759,346	714,292	66,638	62,007	842,937	175,800
1947	848,027	698,281	177,305	140,230	955,816	68,011
1948	850,105	770,396	69,910	57,598	897,904	20,848
1949	870,113	648,285	56,929	91,526	796,740	94,221
1950	910,354	849,246	18,189	128,256	995,691	8,884
1951	931,833	836,800	42,067	39,949	918,816	21,901
1952	961,430	803,343	56,202	36,626	896,171	87,160
1953						
Jan.	81,994	77,573	2,205	901	80,679	88,475
Feb.	76,899	67,729	1,997	1,984	71,710	93,664
March	83,485	72,388	1,315	3,582	77,285	99,864
April	80,459	78,211	215	7,617	86,043	94,280
May	82,422	75,648	259	8,343	84,250	92,452
June	81,617	72,612	36	4,136	76,784	97,285
July	80,825	69,498	94	4,612	74,204	103,906
August	83,241	65,450	428	3,372	69,250	117,897
Sept.	81,144	55,167	165	2,215	57,547	141,494

Note: All regularly operating U.S. primary and secondary smelters are included in the statistics, as well as production from foreign ores.

World Copper Stocks Up

Though world stocks of refined copper have increased from 195,356 tons at the end of April to 309,243 tons at the end of September, the gain resulted largely from an accumulation of metal in Chile where large tonnages remain unsold because of price control.

The August and September statistics of Copper Institute, embracing most of the Free World's output, in tons, follow:

United States		
Production:	(a) Aug.	Sept.
Crude, primary	79,376	79,479
Crude, secondary	5,577	7,681
	84,953	87,160
Refined copper	108,974	114,760
Deliveries, refined	106,985	104,886
Stocks, refined	78,825	72,907
Outside United States		
Production:	(a) Aug.	Sept.
Crude, primary	123,550	118,578
Crude, secondary	996	1,435
	124,546	120,013
Refined copper	90,340	68,996
Deliveries, refined	43,908	47,079
Stocks, refined	209,220	236,326

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York unless otherwise stated

MISCELLANEOUS METALS

Oct. 31, 1953

Aluminum ingot, 99 plus percent, lb.	21½¢
Antimony, spot, lb., 5 tons and up but less than carload, packed in cases	37.97¢
Bismuth, ton lots, lb.	$2.25
Cadmium, commercial sticks, delivered, lb.	$2.00
Calcium, lb., ton lots, 98 percent, cast	$2.05
Chromium, 97 percent grade, lb., contract	$1.18
Cobalt, 97 to 99 percent, per lb.	$2.40
Germanium, lb.	$295.00
Indium, troy oz.	$2.25
Lithium, lb., 98 percent	$11.00 @ $14.00
Nickel, cathodes, lb., f.o.b. Port Colborne (a)	60¢
Magnesium, 99.8 percent, carloads, lb., producer's plant, Freeport, Texas	27¢
Palladium, troy oz.	$22.00 @ $24.00
Platinum (Official quotation wholesale lots) troy oz.	$92.00 @ $93.00
Quicksilver, flask of 76 lbs., 25 flasks or more	$183 @ $185
Selenium, 99 plus percent, lb.	$4.25 @ $4.75
Silicon, minimum 97 percent, carloads, lb.	18½¢
Tellurium, lb.	$1.75
Thallium, 100 lb. or more, lb.	$12.50
Titanium, 99.3 plus, lb.	$5.00

(a) Includes U. S. duty.

METALLIC ORES

Beryllium Ore, imported, 10% BeO, per unit	$46.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry	
44% Cr_2O_3 no ratio	$27.00 @ $32.00
48% Cr_2O_3 3 to 1 ratio	$44.00 @ $55.00
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer (b)	$10.30
Mesabi bessemer (b)	$10.05
Mesabi, non-bessemer (b)	$9.90
Lead (Galena), 80 percent, Joplin, Mo., ton	$166.50
Manganese Ore—Per long ton unit of Mn basis 48 percent manganese, nearby positions, subject to premiums and penalties $1.12 @ $1.14 c.i.f. U. S. ports, duty extra. Long-term contract nominal at 90c. to 93c., c.i.f. duty extra.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	60¢
Tantalite, 60% concentrate, per lb.	$2.50 @ $3.00
Tungsten Ore, per unit of WO_3	
Foreign, 60 percent, c.i.f. U. S. ports, duty extra	$38.00 @ $40.50
Domestic, scheelite, 60 percent f.o.b. mill	$63.00
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	41¢
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$56.00

(a) F.o.b. port of shipment. (b) Effective July 1, 1953.

METALLIC COMPOUNDS

Arsenous Oxide (arsenic trioxide) lb., in bbl. carload lots delivered	5½¢
Cobalt Oxide, 72½% to 73½%, ceramic grade, per lb.	$1.82 @ $1.84½
Copper Sulphate, 100 lb.	$10.35
Germanium Oxide, lb.	$142.00

ALLOYS

Ferrochrome, 65 to 69 percent, per lb. of Cr contained	24¾¢
Ferromanganese, 74-76%, net ton, seaboard	$200
Ferromolybdenum, 55 to 65 percent Mo, lb. of Mo contained	$1.32
Ferrosilicon, 50 percent per lb. of contained Si	12.4¢
Ferrotungsten, 75 to 80 percent, lb. of W contained	$4.10
Ferrovanadium, per lb. of V delivered	$3.00 @ $3.25
Silicomanganese, Max. 1½ percent carbon, per lb. contracts	11.4¢
Spiegeleisen, per long ton, 19 @ 21% grade	$86.00

NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U.S. funds) ton:	
Crude No. 1	$960 @ $1,500
Crude No. 2	$595 @ $900
Spinning fibers	$421 @ $514
Shingle fibers	$150 @ $200
Paper stock	$109 @ $137
Waste	$77
Shorts	$35 @ $70
Asbestos, Vermont, f.o.b. Hyde Park:	
Spinning fibers	$279.50 @ $302.00
Shingle stock	$135.00 @ $162.00
Paper stock	$81.50 @ $115.00
Waste, stucco or plaster	$71.40
Refuse or Shorts	$34.00 @ $63.00
Barytes, f.o.b. cars:	
Georgia crude, per ton	$14.00
Missouri, 94 percent $BaSO_4$, per short ton	$13.25
Bauxite, long ton, f.o.b. point of shipment:	
Domestic, crude, 50 to 52 percent (not dried)	(a) $5.00 @ $5.50
Domestic, chemical, 55 to 58 percent	(a) $8.50 @ $9.05
Domestic, abrasive, 80 to 84 percent	(a)$18.00 @ $18.50
China Clay, f.o.b. mines, ton:	
Georgia, filler and ceramic grades	$8.50 @ $9.50
North Carolina ceramic grade	$20.25 @ $22.25
Feldspar, bulk ton:	
Potash or soda feldspar, 200 mesh, ceramic grade	$18.50 @ $22.25
Glass feldspar, white, 20 mesh	$11.75 @ $12.50
Fluorspar, f.o.b. mines, bulk, 70% effective ton	$42.50
60% effective CaF_2	$38.00
Acid 97% concentrate, bulk, ton	$57.50 @ $60.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00 @ $14.00
Magnesite, per ton dead burned, bulk, f.o.b. Washington	$38.00
Mica—Domestic, f.o.b. mines. Punch 12 to 22¢. per lb. according to size and quality. Sheet clear, 1½ x 2 inch, 70¢. to 85¢.; 2 x 2 inch, $1.10 to $1.60; 2 x 3 inch, $1.50 @ $1.60; 3 x 3 inch, $1.80 @ $1.90; 3 x 4 inch, $2.20; 3 x 5 inch, $2.40; 4 x 6 inch, $3.15; 6 x 8 inch, $4.25. Wet, ground, very fine, $140 @ $155 per ton. Bulk sales, dry ground: $32.50 @ $70.00 per ton Scrap $32 and up.	
Ocher, Georgia, ton, in sacks	$30.00
Pyrites, Spanish, per long ton unit of S, c.i.f. Atlantic ports	Not quoted
Sulphur, Texas, mines, long ton	$25.50 @ $27.50
Talc, f.o.b. works, ton:	
New York, purified	$18.50 @ $20.00
Vermont, extra white	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$30.00

(a) Nominal.

IRON AND STEEL

Pig Iron, gross ton, basic, Valley Furnaces	$56.00
Steel f.o.b. Pittsburgh, billets, net ton	$62.00
Structural shapes, 100 lb.	$4.10

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PLATES—Many types including Inland 4-Way Safety Plate
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TUBING—Seamless & welded, mechanical & boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
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Our Protective Tariff Religion (*Continued from page 82*)

protected—industry such as sugar cane growing, should be making machinery to be traded for the cheap sugar of Cuba, for example. Both sides to the trade should prosper by having more and cheaper goods.

A curious phenomenon in the western world today is that thought and action in business and trade are nearly always considered only from the point of view of the producer. Yet all producers are consumers, indeed the latter greatly predominate. The unconscious irony to which this often leads is illustrated by a recent incident in France. Since the war the soft drink Coca-Cola has made large inroads on the sale of wine. State action was taken to block importation of Coca-Cola. An American reporter wrote in a news dispatch "you can't blame *Them* (ital. by author) for that." Now, of course, the reason Coca-Cola was sold in large quantities was that many French consumers preferred it to wine, largely, perhaps, because it was cheaper. Their preference, however, was never mentioned. Concern was for the *wine producer* only.

So it is in most tariff matters. All production is ultimately for the consumer, yet his interest and preference are usually ignored.

The Wall Street Journal reported on March 18, 1950 that a campaign was being waged by the northwest Douglas fir producers against the "invasion" of the U. S. markets by Canadian producers who sell 25 per cent of the U. S. consumption. The following pertinent Canadian comments are requoted, "You can't have international trade without pinching somebody's foot", says a Vancouver lumberman, "The *distributors* and *consumers* in the U. S. are delighted to get our lumber."

"Another British Columbia mill owner defends the Canadian position this way: 'We just rebuilt a mill that burned last summer. Every piece of equipment came from the United States. How could we have bought it without U. S. dollars?' These dollars were largely obtained by selling lumber to the United States.

"The editor of a Canadian lumber trade magazine tartly sums up north-of-the-border opinion this way, 'The Americans are always crying.' "

To summarize: Trade in goods or services increases the wealth or income of both parties to it. This is as true of trade between large economic groups or countries as between individuals. Trade cannot be one-way except through the use of the limited gold reserves or by uncollectable loans or gifts of money. Both sides benefit or it would not take place. Even assuming that a nation could receive a flood of goods without trading in return, it could not be ruined by being given wealth gratis. Indeed, nations often try to gain such wealth by force of arms, i.e., by international banditry. The pressure for such drastic action can be reduced by unimpeded trade.

The realities of the needs of the national defense, entrenched tariff protection with its growth of uneconomic industry, and widespread ignorance of basic economics make it neither possible nor desirable suddenly to lower tariffs and other barriers to trade. It is to be hoped, however, that the public-spirited, articulate and influential minority can be brought to comprehend the basic facts of trade. This accomplished, progress, even if slow, should nevertheless be inevitable.

Free Trade—Theories and Realities (*Continued from page 83*)

lumber mill would get across the line without paying a stiff duty. Britain enjoys preferential tariff treatment from Canada and yet the United States supplies Canada with more goods and equipment in competitive trade notwithstanding the disadvantage of paying higher duties. It would seem that lower tariffs alone are not the answer to a greater volume of trade.

If there is one instance where free trade should be feasible probably it is between the United States and Canada. But if such a program were to be proposed, which country would raise the greater objections?

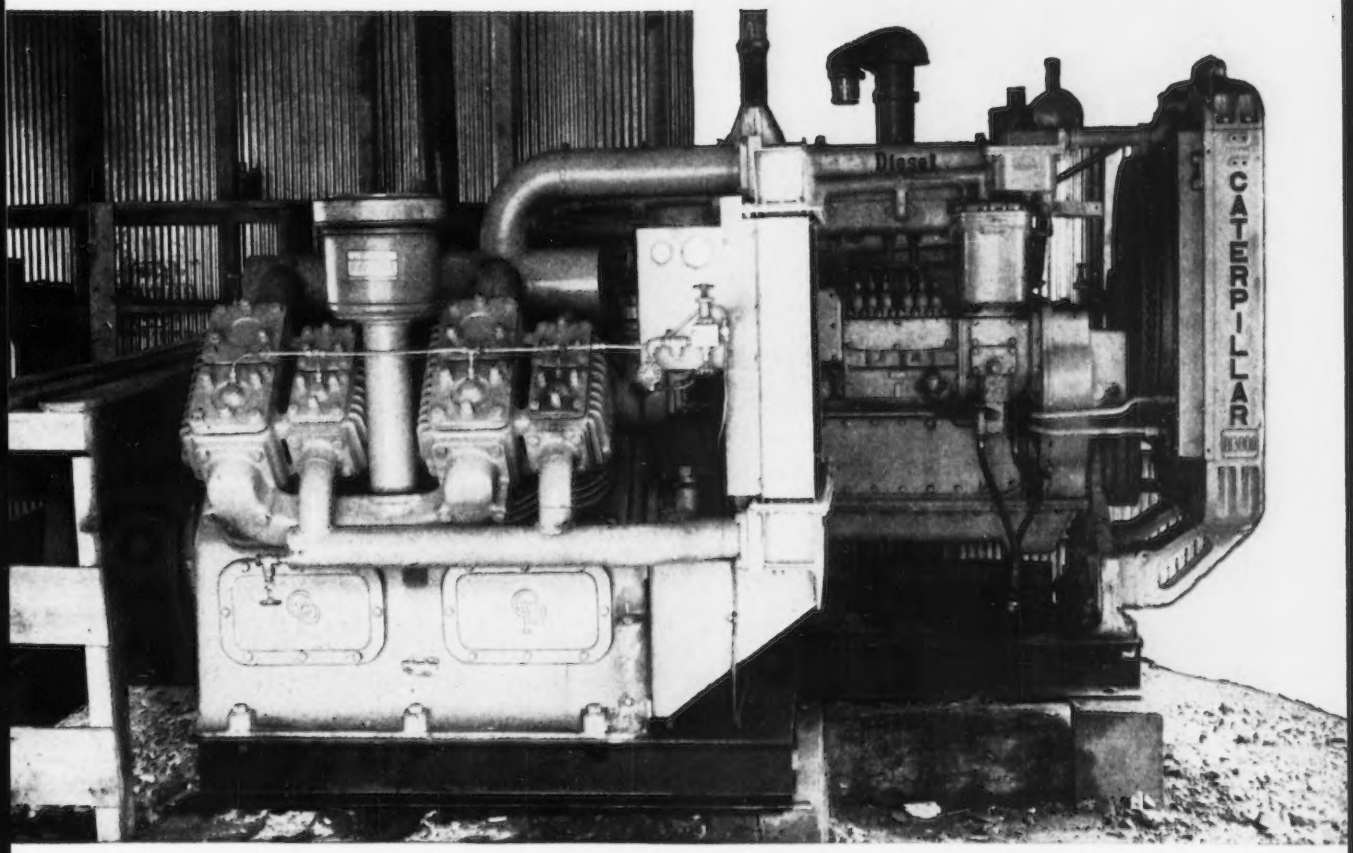
The Place of the United States

It is difficult to picture the place of the United States in an expanded world trade in competition with the impoverished and undeveloped countries of the world. We are largely self-sufficient and our people enjoy wage scales and living standards far above other nations. We do not need imports of goods and materials produced in sufficient quantities at home, and we cannot export to any great extent products of agriculture and mining in competition with the lower wage scales and cheaper prices of South America, Asia, and Africa in world markets. If we loan other nations money to buy our goods and they cannot repay, our exports are, in fact, gifts. When loaning ends, buying stops, and the world has another depression. Gifts are not exports, and neither world friendship, respect nor reliance is built on defaulted loans.

Possibly the answer may be found in part in foreign investment of private capital and our excess savings in countries where assurance of fair treatment may be found. Backward and undeveloped countries need capital and technical assistance for new industries, development of highways, railroads and electric power. Public utilities call for huge investments and offer great opportunities to development organizations and engineering skill. By affording Central and South America, the Near East and eastern Asia a chance to industrialize and raise living standards, the oversupply of labor which causes low wages may be taken up in time by industrialization. And the excess of cheap raw materials which competes in our markets may find more use in industry at home.

Our problem and the first need of the world today is to keep America strong and resourceful. The productive capacity, wealth and credit of the United States have saved us thus far. We must maintain our economic stability and protect our productive resources as a means of preparedness in the world struggle against aggression. This cannot be accomplished by liquidating our farms, forests, mines and fields, or destroying our capacity to pay high wages through the promotion of uneconomic world trade. The United States will be a great power until it has impoverished its soil, exhausted its coal and oil, abandoned its mines and lost its capacity for production and self-reliance. And world stability depends greatly upon a prosperous United States.

"We just start it up and it goes"



Up in Salida, Colo., at 8500 feet elevation, the Frank H. Norberg Co. recently installed a husky Caterpillar D13000 Diesel Engine. It drives a 500-ft. Chicago Pneumatic stationary compressor, mining limestone for use in steel flux and refining beet sugar. It's dusty work, at high altitude, in extreme summer-winter temperature variations.

"We use only Cat* power," says Superintendent W. H. Larson, "because we just start it up and it goes—with little care or trouble."

The company's new engine is the choice of *experience*. They also have a Cat HT4 Shovel, a D4 with Eimco rocker bucket, and another Caterpillar D13000. Owner Frank Norberg says, "In my 30 years of rock engineering, when I've needed power I've never considered anything but Caterpillar. I'm more than pleased with this equipment."

Many mining operators have found that it pays to standardize on Caterpillar equipment. Because these rugged yellow units are noted for long, pamper-free work life, they return you a profit for many years. Standardization also pays off in increased operator familiarity, and in a single, responsible source for parts and service. That source is your nearby Caterpillar Dealer, who offers fast, skilled service and a full line of genuine factory parts.

All Caterpillar Engines deliver full, honestly rated power, and idle without fouling, on low-cost No. 2 furnace oil. Engines and electric sets range up to 500 HP and 315 KW. Leading manufacturers can supply Caterpillar Engines in their equipment, or your dealer can install them when you repower. Ask him to prove the dollars-and-cents advantages of Caterpillar power today.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks - (R)

SPECIFY CAT POWER FOR HIGH-PROFIT PRODUCTION

cut carbide bit losses

USE CRUCIBLE

DOUBLE DIAMOND

HOLLOW DRILL RODS

Here's the finest, toughest hollow drill rod made. Crucible DOUBLE DIAMOND is made to tool steel specifications by the nation's leading producer of tool steels.

That's why it has greater fatigue strength . . . and greater fatigue strength means lower drilling costs — less down time and fewer losses of those valuable tungsten, carbide bits.

You can't afford to overlook the advantages of this fine alloy drill rod in your drilling operations. Write for full details.

CRUCIBLE first name in special purpose steels

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HOLLOW DRILL RODS

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REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

E & M J

NEW PRODUCTS DIGEST

For further information on these products, circle item numbers on card—insert and mail.

SECTION OF PIPE about to be patched is shown above. Pipeman holds a piece of Fiberglas to be applied.

AFTER APPLICATION OF RESINS and Fiberglas patch, the pipe section is bound with Fiberglas tape.

New Speedy High-Pressure Pipe Patch (1)

PATCHES CAPABLE OF withstanding pressures of 2,000 psi can now be made on pipes of any diameter in 10 min. The pipe can be readied for service in 40 min. The process has been developed by the Cordo Chemical Corp., New York, N. Y. No external heat is required, and no special skill is necessary to apply the patch.

Procedure is simple. First pour a small amount of activator into an accompanying can of Epoxy resin called Cordo Bond. When stirred, the heat of reaction between activator and bond is sufficient to produce a liquid resinous bond. Smear the area around the hole in the pipe, and cover with a Fiberglas patch saturated with resin. The resin acts as reinforcing. After the resin sets for about 6 min., the whole patch is wrapped with glass tape to provide extra strength.

While Fiberglas tape cloth or mat saturated with Epoxy resin will withstand pressures of 2,000 psi, this figure is only reached under ideal circumstances, and merely indicates the strength that can be attained. Much of the strength is due to the bonding action of the resin with the metal. For this reason the surfaces must be cleaned down to metal before the patch is applied.

Other applications are possible by varying the formula. For instance a "Strong Back" putty for repairing small holes or cracks under slight pressure is made by using diatomaceous earth as a filler. With shredded cloth as a filler, the resin can be used for patching larger holes.

YOU get more for your money than just a tractor!

WHEN you buy a piece of Cat* equipment, you think of a lot of other things besides tough steel and yellow paint. Things you can't see or feel or touch, but that will help you make *more money this year—and year after year!*

You *know*, for instance, that you can count on profitable production because your equipment will keep you on schedule. Its stamina, *plus* on-the-spot service from your Caterpillar Dealer, cuts down time to the minimum.

You *know* the bank will give you better financing on big yellow machines because of their reputation.

You *know* there are no "orphans" in the line. You can work Caterpillar machines profitably for years and *always* get parts for them—at the standard low list price.

You *know* that day after day, week after week, month after month, they will do *more* work with *less* down time at *lower* cost than any competitive units.

And, finally, you *know* that when you're ready to trade in a Cat machine you'll get more money for it—the *top* resale value in the field.

Getting ready to buy mining units? Fine. Look them all over. *But look at their last cost first.* Remember what you *know* about Caterpillar!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Equipment Shorts

FIRE BLANKET. A vinyl plastic coated glass cloth fire blanket provides protection against fire tragedy for both human life and small industrial equipment. Manufactured by Standard Safety Equipment Co., Chicago, Ill., the rugged protective blanket is thrown over a person or machine enveloped in flames; this effectively cuts off the oxygen and quickly smothers the fire. (31)

MINE LOCOMOTIVE. Hunslet Africa (Pty.) Ltd., claims to have produced the world's smallest practical diesel mine locomotive. It can be brought down to a length of 4 ft. 9 in. by removing the 12 bolts that secure the buffer beams. When fitted with the Hunslet central spring buffing and draw-gear, the overall length is 6 ft. 3 in. The overall width has been kept down to 3 ft., and the height to 3 ft. 8 in. above rail level. The locomotive is therefore able to work in restricted places and can be moved from one level to another at short notice or brought to surface if desired. In keeping with the conditions in narrow drifts, the maximum speed of the locomotive has been limited to 4½ mph. A locomotive of this type will have applications in distant development areas of a mine, and many out-of-the way places where minimum supervision can be given to track conditions. (32)

TAPE. Containing a pressure-sensitive compound, a new tape is expected to replace conventional friction tape and splicing compounds generally in use in the electrical field for insulation on wires, according to D. M. Raleigh, product manager of the manufacturing company's light mechanicals department. Designed not only for electrical applications, this tape is practical for many other uses such as taping tools, fishing rods, and repairing hose. The tape comes in 60- and 20-ft. rolls in ¾-in. widths, and in a 12½ ft. roll with a ½-in. width. Average retail prices will range from 34¢ for the smallest roll to $1.40 for the largest size. Boston Woven Hose & Rubber Co., Cambridge, Mass. (33)

BUTANE-PROPANE HOSE. Ironsides butane-propane hose, which has a combination of layers of horizontally braided steel wire and rayon cord reinforcement, has been announced by Quaker Rubber Corp., division of H. K. Porter Co., Inc., Philadelphia, Pa. Specially developed for the handling of liquefied petroleum gases, the hose features a non-porous and oil resistant rubber tube and extra strong reinforcement. Each size has a minimum burst pressure of 1,750 psi, with actual burst pressures of 2,300 psi. Each length has two separate static wires, interlaced with the reinforcing braids to insure full static conductivity. Made on a mandrel which insures uniform inside diameters, for quick, positive coupling, the hose is available in sizes from ½-in. to 2-in. (34)

ONE-MAN AUTOMATIC DRILLING MACHINE. Thor Power Tool Co., Aurora, Ill., announces a new automatic drilling machine featuring an integral air-leg feed and automatic air-water back-head. The new machine, No. 380, is equipped with a specially designed 45-lb. sinker rock drill and a 2¼-in. diameter feed leg, available in either 36-in. or 48-in. length, to make it adaptable for all types of drilling at all angles. The drill can be removed from the leg and used as a sinker simply by loosening one nut. Other features are: exclusive six-position throttle control; a single air hose to supply air to drill and leg; hinge joint between drill and leg with tension adjustment; convenient, safe location of controls on back-head, aluminum cylinder and piston, and total weight of only 80 lb. (35)

LARGEST MINE LOCO. What is claimed to be the world's largest mine locomotive, a self-contained main line haulage unit comprising two twenty-ton locomotives powered by 37 tons of storage batteries, has been installed in the Olga No. 1 mine of the Olga Coal Co. at Coalwood, W. Va. The entire unit consisting of two Jeffery haulage locomotives and two power cars housing 625 kw. hr. of Gould batteries is over 100 ft. long and stands less than 4 ft. off the rails. The unit will haul coal from the working faces of the mine some 4 to 6 miles to the shaft bottom in 50-car trips. (36)

EXHAUST VENTILATION. How to operate gasoline-powered equipment safely despite poor ventilation in a confined area—on a contract to deepen a building's basement, was effectively solved by fitting the tractor engine with an OCM Catalytic Exhaust System. This device, manufactured by Oxy-Catalyst, Inc., Wayne, Pa., was substituted for the regular muffler. It oxidizes poisonous carbon monoxide and hydrocarbon vapors, exhausting a harmless effluent to the working atmosphere. (37)

CALIBRATED WIRE ROPE. Development of a new accurately calibrated wire rope which makes "at-a-glance" length measurement possible for the first time in the $200,000,000 industry has been announcd by Paulsen-Webber Cordage Corp. The new rope is marked in accurate colored bands at five-foot intervals, as standard practice, but may be marked in feet or fathoms at any desired intervals for ready measurement. Prior to this development wire rope could only be measured by special warehouse measuring equipment or by unreeling it and measuring wanted lengths by hand. (38)

USE THIS CONVENIENT CARD

to obtain further information on products and bulletins mentioned in the New Products Digest. Circle item numbers, tear out and mail.

Not good after January 1, 1954, if mailed in the U.S. or Canada.

Engineering and Mining Journal—November, 1953
NOT GOOD AFTER JANUARY 1, 1954—if mailed in U. S. or Canada

Please send me the catalogs or further information about the items from New Products Digest whose numbers are circled.

1	8	15	22	29	36	43	50	57	64	71	78	85	92
2	9	16	23	30	37	44	51	58	65	72	79	86	93
3	10	17	24	31	38	45	52	59	66	73	80	87	94
4	11	18	25	32	39	46	53	60	67	74	81	88	95
5	12	19	26	33	40	47	54	61	68	75	82	89	96
6	13	20	27	34	41	48	55	62	69	76	83	90	97
7	14	21	28	35	42	49	56	63	70	77	84	91	98

My Name ..... Position .....

Company .....

Address .....

For Your Files

This informative manufacturers' literature is free unless otherwise specified. To obtain bulletins circle their numbers on card below and mail.

POWER SHOVEL. Marion Power Shovel Co. has announced a 12-page bulletin, No. 408, describing the Marion 111-M Ward Leonard Electric Shovel. The unit carries a standard 4-yd. dipper or bucket, and is featured as shovel, dragline, clamshell, crane, and coal loader. As dragline, the bucket capacity varies from 3 to 4½ cu. yd., depending on the length of boom. Its rated crane capacity is 165 tons. (63)

CHAIN AND SPROCKETS. In this 24-page bulletin the man who selects, specifies or buys roller chain and sprockets will find all the data required. One page is devoted to Taper-Lock sprockets for each size of chain from #40 through #100 inclusive. Each page includes: cross section drawing, dimensions, number of teeth, list prices with and without bushings, sprocket number, bushing number, maximum stock bore available, weight of sprocket with bushing, and price list of chain in that size. Five pages of selection data for roller chain drives include tables of service factors, horsepower ratings, calculation of chain length, center distances and speed ratios. Installation, adjustment, lubrication and maintenance information is also given. Dodge Mfg. Co., Mishawaka, Ind. (64)

ELECTRICAL MEASUREMENT. A revised edition of the General Electric Co.'s 64-page measuring equipment catalog, GEC-1016A, containing information on more than 115 testing and measuring devices for laboratory and production line use, has been announced as available from the company at Schenectady 5, N. Y. (65)

V-BELTS. The Industrial Division of Durkee-Atwood Co., Minneapolis, Minn. has just issued a new 60-page engineering catalog on industrial V-belts and their applications. The catalog is the first published with the new increased horsepower ratings approved by the Rubber Manufacturers Association. It is a technical publication specifically prepared for design engineers, maintenance engineers and selected purchasing personnel who will find it helpful as a V-belt power transmission guide. (66)

CLASSIFIER. Bulletin No. C-1-S-2 on the Wemco S-H classifier has been published by Western Machinery Co., San Francisco, Calif. This illustrated, 20-page bulletin provides complete information on the design features and performace characteristics of Wemco Classifier units. Also included are useful operating notes and calculations used in wet classification processing as well as handy reference tables listing classifier specifications and capacities. (67)

TELEMETERS. A bulletin describing the company's new multiplexing transmitting and receiving system for use with Metameter telemeters has just been announced by the Bristol Co., Waterbury, Conn. It describes the use of the new system for transmitting up to 15 readings (over a single circuit 15 and distance) of pressure, vacuum, temperature, flow, water or liquid level, static and differential pressure, motion, voltage, current, or totalized load taken at separate areas to Metameter receiving instruments. (68)

DUMP CARS. Bulletin #5000, recently released by Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., illustrates the mechanical design of Western air-operated railroad dump cars. Specifications cover both 30 and 50-yd. capacity units. Illustrations portray special features that enable cars to stand up under long-term hauling and dumping with a minimum of maintenance. (69)

STATIONARY ENGINES. Publication of 8-page, 2-color Bulletin 197 containing construction and operating data on Nordberg four-cycle Supairthermal V-Type stationary or marine engines is announced by Nordberg Mfg. Co., Milwaukee, Wisc. Specifications present the weight and ratings of both the 12 and 16 cylinder engines which cover a horsepower range from 2,400 to 4,260 at 450 to 600 rpm. Gives information on the pressure lubricating system and fuel systems for oil and/or gas operation. (70)

CRANE TORQUE CONTROL. Orton Crane and Shovel Co., Chicago, Ill., in applying the GM Allison torque converter to their pneumatic-tired, one-man Aero-Crane, has made the unit an almost completely "desk-operated" job. A complete description of the crane, together with separate treatment of the torque-control unit, specifications and capacities, are described in a new 16-page brochure, Bulletin 85. (71)

SOIL CONDITIONER. A synthetic soil conditioner which has been effectively demonstrated to help control rain and wind erosion on construction sites, levees, rights-of-way and similar applications, is available from the Organic Chemicals Division of Monsanto Chemical Co. Complete description of Bondite and how it works is available in a 10-page bulletin. (72)

PLATE MAGNETS. Magnetic Engineering & Mfg. Co. announces catalog #253-A describing and ilustrating Memco Alnico permanent non-electric plate magnets, made in a complete range of sizes, standard widths from 4-in. to 48-in. and larger magnets on application. (73)

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TIMBERLIFT can mechanize your timber crew. Hydraulically powered, it will lift timber from car to roof in half a minute and hold it there with no effort. Capacity is one ton and unit can raise timber to height of over 8 ft. Cost is $550. Ruger Equipment Co., Uhrichsville, Ohio. (2)

MIDGET CUPOLA FURNACE is capable of melting 54 lb. of brass an hour. Developed at the University of Missouri's School of Mines, the furnace is only 18 in. high with an internal diameter of 3½ in. as compared to the regular cupola furnace in background which is 25 ft. high. (3)

SPEED CONTROLS. Bulletin V-532, describes the Reeves Flexi-Speed Drive, the latest addition to the Reeves line of variable speed drives and controls, Reeves Pulley Co., Columbus, Ind. (74)

LABORATORY APPARATUS. A 4-page bulletin, No. 328, which describes, illustrates and lists prices for the most frequently ordered items in the line of scientific apparatus and laboratory chemicals made by Burrell Corp., Pittsburgh, Pa., is now available. (75)

VIBRATING SCREEN—Booklet 122J describing in detail its new Style J Vibrex vibrating screen is available from Hewitt-Robins, Inc., Stamford, Conn. Available in various sizes, the J-Type Vibrex screen is made with a single deck for suspended mounting only and is offered in two styles, with the vibrator either above or below the screen deck. (76)

PIPE COUPLINGS—Folder 102 on Morris compression pipe couplings explains their use on cast-iron steel and asbestos-cement pipe, threaded or mechanical joint, with prices, sizes and other specifications. Morris Coupling & Clamp Co., Ellwood City, Pa. (77)

what's NEW in Engineering

A synthetic soil conditioner has been announced which helps to control rain and wind erosion on construction sites, levees, rights of way and similar "bare ground" sites. Designed to stabilize aggregates on the soil surface, it helps to hold seeds and soil in place until vegetation cover takes over the job.

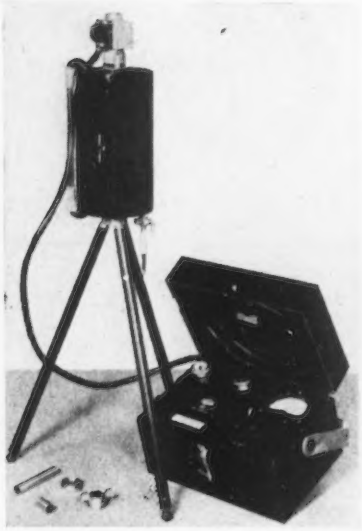
Deep-sea divers joined a small army of engineers and construction crews in driving over 42,000 piles at a riverside site for a Louisiana plant—to provide a stable foundation in mushy ground. Divers, working 40 feet down in the Mississippi River, were required to direct

placement of the concrete seal. We'll send you a 32-page illustrated book which tells how Kaiser Engineers is equipped to meet challenging problems—like this one at the nation's largest aluminum plant, which was producing metal in just 10 months.

A pocket pyrometer, now on the market, gives direct reading of temperatures up to 3,300 deg. F. Only six and one-half inches long, it weighs about five ounces, and is shaped like a miniature telescope.

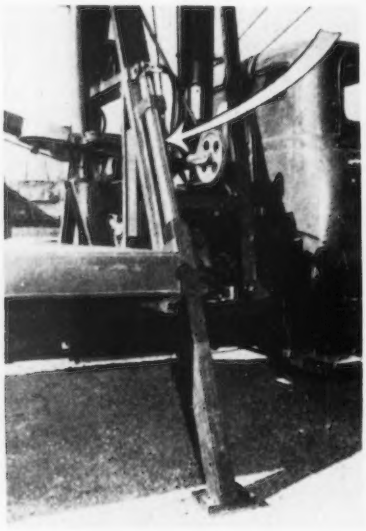
Whether it's designing an oil refinery, building a porcelain enameling plant or laying out a site plan, Kaiser Engineers undertakes the job with assurance because of the variety of talent within the organization. Successful experience in a wide field of design, engineering and construction tells the story. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

(Advertisement)



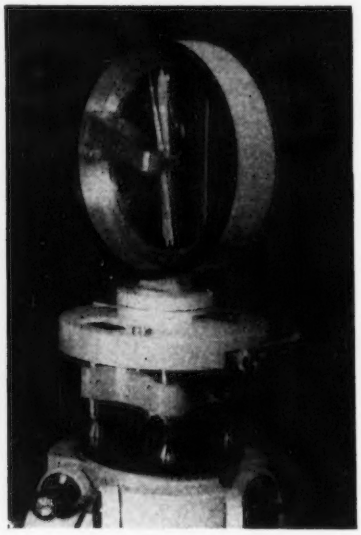
Dust Measurement (4)

This "Thermal Precipitator", for highly accurate sampling of dust, is one of a line of dust measuring instruments made by C. F. Casella & Co., England, distributed in the U. S. by Mine Safety Appliances Co., Pittsburgh, Pa. Other instruments include the "Cascade Impactor" for discriminatory collection by size; "Settlement Dust Counter" for accurate collection; and "Jet Dust Counter" for rapid sampling.



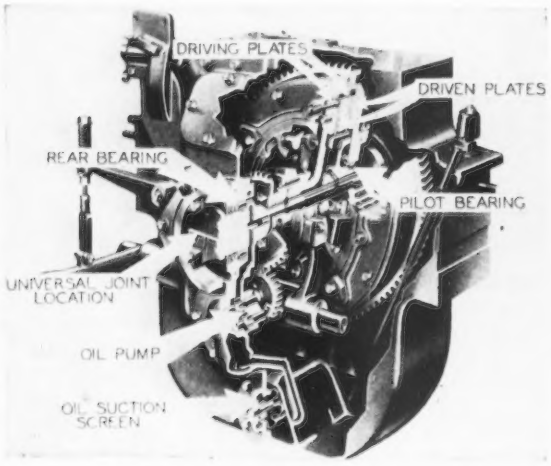
Outriggers (5)

Hydraulically operated outriggers are now optional equipment on the model B "Hydra-Lift" truck-mounted crane made by Pitman Mfg. Co., Kansas City, Mo. With outriggers hydraulically powered for simple control, crane operators save time in using outriggers for safe lifting of borderline loads. If the truck is on uneven ground, outriggers may also be used for levelling truck before picking up loads.



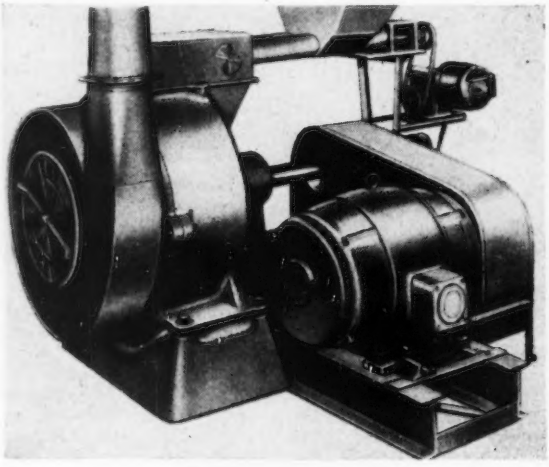
Superdip (6)

Redesign of the Hotchkiss superdip has been completed and Ruska Instrument Corp., Houston, Tex., is now offering a new superdip that is lighter, more compact, and has a needle system which is temperature compensated. Total weight is now 10½ lb. as compared with 18 lb. formerly. The needle system is equipped with highly polished tungsten steel pivots resting on sapphire bearings. This increases sensitivity of the unit.



Oil-Type Clutch for Cats (7)

Two important claims are made for the oil-type flywheel clutch by the maker, Caterpillar Tractor Co., Peoria, Ill. (a) it is the first successful oil-type clutch to be used in the crawler tractor field, and (b) it will operate two to four times longer than equivalent dry clutch before major adjustment or overhaul is necessary. Oil pumped from reservoir is discharged around inside diameter of friction discs. It flows through slots in friction faces and pressure plates and absorbs entire engine load until last few revolutions before full engagement. Unit is standard on D8 and D6 tractors and No. 6 shovel.



Pulverizer (8)

Outstanding feature of the "Superfine" pulverizer, manufactured by Schutz-O'Neill Co., Minneapolis, Minn., is the wide range of product sizes from coarse (20 to 80 mesh) to ultrafine (3 to 5 microns). The pulverizer depends for effectiveness, on the use of centrifugal forces and air currents to grind by shear and impact, with simultaneous internal classification and recycle of oversize. Other features include temperature and humidity control, and ability to blend up to 4 materials in one grind. Crystalline, granular, or fibrous materials can be handled with only minor modifications of liners or beaters.

HIGH QUALITY LIME

with Minimum Fuel and Labor Cost

200 Ton per day plant

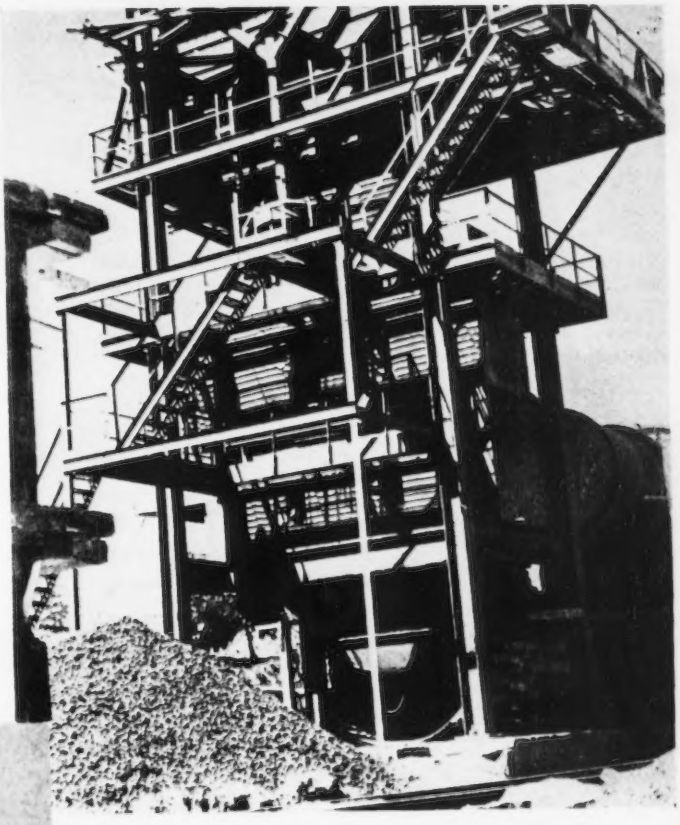
operating at LOW COST . . .

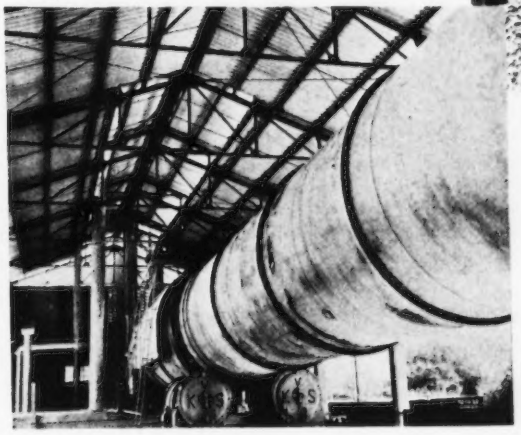
This typical example of KENNEDY modern lime plant is in operation at Cal de Apasco, Apasco, Mexico. Equipped with 10′ x 150′ Kennedy rotary Kiln, with preheater and deheater and internal heat exchanger, this modern plant produces more than 200 tons, daily, of high quality lime. Operation and maintenance costs are low, labor requirements are minimum, fuel consumption extremely low.

Regardless of location, Kennedy can engineer-design and equip a lime, cement or mining plant to produce peak capacities at lowest cost.

KVS machinery and equipment is designed and built to serve specific uses . . . *known* to operate properly and at lowest cost under all conditions . . . proven best through a half-century of use in leading plants throughout the world.

Our engineers are available for consultation anywhere, anytime. Send for bulletins describing KVS lime, cement and mining machinery.





200 TON PER DAY LIME PLANT 10′ x 150′ KENNEDY KILN WITH PREHEATER, DUST CHAMBER AND BY-PASS STONE FEEDER

10′ x 150′ KENNEDY KILN WITH PREHEATER AND DEHEATER AND INTERNAL HEAT EXCHANGER

IT COSTS LESS.. TO OWN THE BEST!

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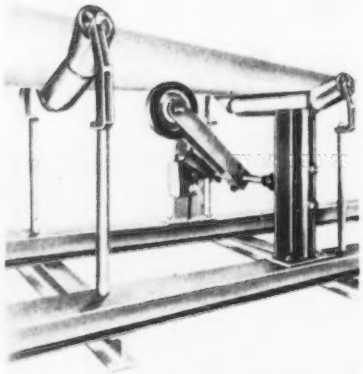
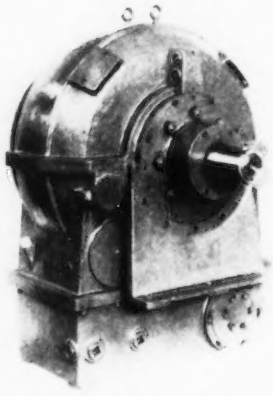
TWO PARK AVENUE, NEW YORK

FACTORY DANVILLE, PA.

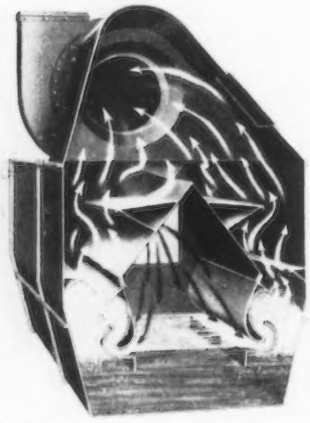
FLEXIBLE HOSE (Portovent) for fume exhaust and ventilation, is easy to install, transport and store. Maintains cross section on sharp turns. American Ventilating Hose Co., N.Y (9)



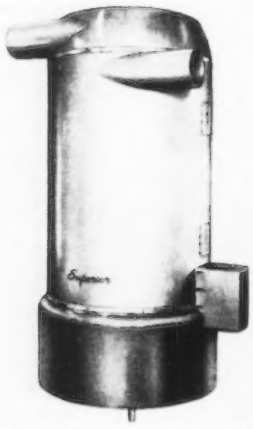
CONVEYOR CONTROL is actuated by load on belt. Deflection of 1/16 in. is relayed to limit switch arm. Easily installed. Johnson-March Corp., Philadephia, Pa. (10)



TORQUE CONVERTERS for medium speed engines cover power range from 325 to 1000 hp., add only 36½ in. to engine length. National Supply Co., Pittsburgh, Pa. (11)

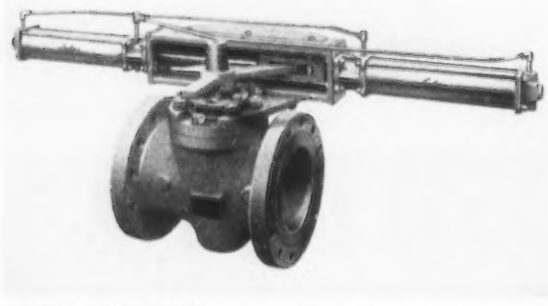


HYDROSTATIC SEPARATOR (Type N "Roto-Clone") separates dust from the air by means of an S-shaped water curtain. Has capacities from 1000 to 48,000 cfm. American Air Filter Co. (12)



CENTRIFUGE for continuous dust removal and particle recovery from air and gas is made by the Superior Separator Co., Hopkins, Minn. The unit is 7 ft. high, and has only one moving part. (13)

SHOVELOADER features lifting heights to 16 ft., dumping heights to 14½ ft., load capacities to 6,000 lb. Uses one-yard bucket, has accessory tools. Baker-Lull Corp., Minneapolis (14)



VALVE ACTUATORS, operated by air, gas, oil or water, are designed as package units for direct installation on gate, plug, diaphragm, butterfly and other control valves in service. Ledeen Mfg. Co., Los Angeles. (15)

ULTRAVIOLET LAMP called "Blacklight Wand" is made by Menlo Research Laboratory, Menlo Park, Calif. Miniaturization of electronic components reduces total weight, including 2 flashlight batteries, to 1¾ lb. (16)

QUICK INTERCHANGEABILITY

Wilmot Chain Will Replace the Same Size Number of **Any** Other Rivetless Chain

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HAZLETON, PA. -- Wilmot Engineering Co., Markle Bank Bldg.
HONOLULU 6, H. I. -- P. S. Pell & Co., Ltd., 88 S. Queen St.
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WASHINGTON IMPACT

Morton A. Reichek, McGraw-Hill Washington News Bureau

Crowded Docket May Delay for Two Years Anti-Trust Trial of ASARCO and St. Joe

A CROWDED COURT DOCKET probably will keep the anti-trust suit against A. S. & R. and St. Joe Lead from trial for at least two years. But the Justice Department's new emphasis on settling cases speedily, through consent decrees or other means, could bring some earlier settlement.

Industry reaction to the suit has been one of bewilderment. Insiders note that there's almost no disagreement on the main facts of the case—that in effect the two companies are charged with violating the law by doing something they've been doing openly for 30 years. The charges are based mainly on buyer-seller contracts between AS&R and St. Joe that began in the 1920's.

The case was investigated and partially prepared under the Truman Administration, but was selected for filing by Attorney General Brownell as a key move in establishing the Eisenhower Administration's anti-trust record. The action is apparently aimed to counteract political criticism that the Republicans are lax on anti-trust enforcement.

Even more, it's designed to dispell Democratic insinuations of sinister skullduggery between a pro-business administration and private industry. In this regard, it's noteworthy that AS&R's board chairman, Roger Straus, is close to Governor Dewey and was a big Eisenhower campaign contributor, and that St. Joe's former vice president, Felix Wormser, is Eisenhower's own Assistant Interior Secretary.

The two companies are charged with control of about two-thirds of the lead sold in the U.S., which to the anti-trusters is "monopoly". They base their charges on long-term toll agreements between AS&R and St. Joe.

The suit says that AS&R refines about 60% of the primary lead in the U.S., and controls about 57% of the U.S. supply through its imports. St. Joe, the suit adds, markets about 26% of the primary lead available. Say the anti-trusters: By 1920, St. Joe had become the largest lead mining company, and second only to AS&R in smelting, refining, and marketing.

Since 1920, the Government charges, the two companies have combined and conspired to suppress and limit competition, control production, fix U.S. and world prices, and to maintain their monopoly of industry. Brownell commented that the industry "has been so dominated by the two defendants that no new producers have entered the industry for almost 35 years."

Latest contract cited is the one signed in November 1951 to take effect this January, the date on which the 1923 basic agreement between the companies expires. The extension allegedly continues the relationship for five years.

Justice says the contracts on the face of it pretty much spell out violation of the Sherman Act. The Department asks that the contracts be ended, and that the companies be divested of whatever properties are "necessary to restore and maintain free and unfettered competition."

The suit is already being compared to earlier anti-trust landmarks. It differs from earlier "implied conspiracy" cases like those against the "Big Four" meat packers in that any "concert of action" was done in black and white on regular business sales contracts.

But the percentage of the market held by the two companies, about two-thirds, brings them well within the target area laid down by standing court decisions on the question of whether bigness per se is illegal. In the 1948 Columbia Steel case, the Supreme Court found that U.S. Steel's 33% of the steel production should not prevent its acquisition of a Government-built steel plant. At the other extreme, Judge Hand, in the Alcoa case, came close to saying that possession of two-thirds to 90% of an industry could be a monopoly, and that possession of 90% or more is almost certainly a monopoly.

Other cases have fallen in between these extremes—to the point where holding upwards of one-third of the market of a primary commodity puts a company in the twilight zone, where it could be charged with anti-trust violation—particularly if Government lawyers find agreements with either competitors or customers that tend to restrain or foreclose competition. Lately the trend of anti-monopoly cases—and this includes the new Republican case against AS&R and St. Joe—has been against two or more concerns for "monopolizing" a field.

Minerals Advisory Council Rebirth

ASSISTANT INTERIOR SECRETARY WORMSER is studying possibilities of setting up a new national minerals advisory council. The Council was first created in 1947 by former Secretary Krug as a mining industry advisory group to the Department and Congress. Four years later, former Interior Secretary Chapman dissolved the Council, at Justice's insistence that the group was an anti-trust risk.

Specific legislation or a formal White House recommendation will be needed to reestablish the Council. According to Justice's anti-trust criteria for such bodies, there must be statutory authority for the Council, or at least finding that the advisory group would perform a statutory function.

The old Minerals Council—and the similar Bituminous Coal Advisory Council—failed to qualify under this groundrule. On the other hand, the National Petroleum Council, created in 1946 but at the formal recommendation of the White House is still functioning. (It's more proof of the petroleum industry's potent Washington influence and mining's relative impotence in the capital.)

The old Minerals Council never really accomplished much, mainly because it didn't live long enough to prove its merit. It was forced to take a back seat to the various metals and minerals advisory committees set up on a commodity basis by the Korea-born emergency agencies.

But the Council was potentially an effective vehicle for the mining industry. A new advisory body would probably be patterned after it. About 50 executives from various segments of the non-fuel mineral industries were Council members. Within the Council there were seven major commodity committees, and functional committees for such subjects as stockpiling, public lands, marginal deposits, American foreign mining activities, labor, technology, exploration and development incentives, taxation, and mineral statistics.

Rebirth of the Council is sorely needed today, mining leaders believe. But they will have to exert strong political pressure for its reestablishment. Justice still frowns on such industry advisory groups. Commerce Secretary Weeks recently was rebuffed in his plan to set up permanent

(Continued on page 118)

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LABOR THIS MONTH

Joseph M. Gambatese, McGraw-Hill Washington News Bureau

NLRB CRACKS DOWN ON COMMIE UNIONS: The Federal Government is moving in on communist-led unions like Mine, Mill and Smelter Workers. The National Labor Relations Board put into effect a new policy denying certification rights to any union having an officer under indictment for signing a false non-communist affidavit or for making false statements to the FBI with regard to communist connections. To give that policy real meaning, the Department of Justice will probably prosecute more vigorously and obtain more indictments.

Until some national official of Mine-Mill is indicted, the new NLRB policy will have only local application against Mine-Mill at Silver City, N. M., and even that is doubtful. Clinton E. Jencks is under indictment because of a non-communist affidavit he signed as president of Mine-Mill Local 890 in Silver City. But he has since been reported to have resigned the local presidency and to be working out of international union headquarters at Denver.

Under the new policy, NLRB will not conduct elections requested by a union having an officer under indictment. Where other unions are involved, NLRB will hold the election, but if the suspect union wins, the certification will be withheld until the indictment is disposed of.

Right now, only two unions have national officers under indictment, thus disqualifying all affiliated locals as well as the national union. Those indicted are Ben Gold, president of the Fur & Leather Workers Union, and Hugh Bryson, President of the Marine, Cooks and Stewards Union. Local unions with officers under indictment and thus ineligible for certification are one of Mine-Mill, one of CIO Packinghouse Workers, and three of United Electrical Workers.

The NLRB policy may be broadened to cover unfair practice cases as well as certifications. This is up to NLRB General Counsel George J. Bott. He has been requiring regional offices to send unfair practice charges filed by communist-dominated unions to Washington for "clearance."

MITCHELL FOR DURKIN: What you can expect now that James P. Mitchell has taken Martin P. Durkin's place as Secretary of Labor:

Some Taft-Hartley amendments have a better chance of getting through Congress next session. They will be less controversial than the 19 amendments Durkin wanted before quitting.

Dewey adherents will have a larger voice in the Administration's labor policies. They picked Mitchell for Eisenhower. Taft sympathizers will have less to say.

Labor leaders welcome Mitchell as a shift away from Taft influence and as one who will do business with them. The new Secretary got along with unions at Macy's and Bloomingdale's department stores and in handling Pentagon manpower problems.

Labor policy discussions will move a step further from the White House. Under Durkin, as AFL leader, the Labor Department bargained for labor at the White House. Mitchell will bargain for the White House with labor spokesmen.

Business executives will still have to get their labor views to Eisenhower through other cabinet members—Weeks, Humphrey, Summerfield.

GUARANTEED ANNUAL WAGE: It's the big bargaining issue of 1954, will come to a head in basic steel negotiations before June 30. CIO Steel Workers began drafting details last month. Thinking is in terms of employer contribution of 10¢ an hour into a lay-off fund. Worker would get lay-off pay, in addition to unemployment compensation, until fund is exhausted. U. S. Chamber of Commerce warns guaranteed wages might start a depression, rather than prevent one. It explains why in a booklet, "Economics of the Guaranteed Wage." It's available for 50¢ from the U. S. Chamber of Commerce, Washington, D. C.

councils for about 20 major industries (excluding mining). But he still has the temporary emergency advisory committees authorized by the Defense Production Act. The GSA-DMPA Metal and Mineral Commodity Committees, set up under the same law, are inactive, however.

S.B.A. No Lending Bonanza

MINE OPERATORS will find no lending bonanza at the new Small Business Administration, successor agency to RFC. In fact, small business in general will find the new agency's purse strings tied pretty tightly. SBA was authorized only $50-million from which to make loans up to $150,000 to small companies, with preference to those in defense or essential civilian industries. And according to the law, borrowers must prove that credit is not available on reasonable terms from regular sources.

Direct SBA loans will be few and far between. So far there have been none. Main purpose of SBA's lending authority will be to "stimulate private lending." The pitch will be to promote local private credit pools; one is now being developed in Colorado. What lending SBA does will be mainly of a "participating" nature. SBA will either assume part of a loan made by a private lending institution, or will obligate itself to assume a portion of a loan while the bank advances the full amount immediately.

Theoretically, mining should rate high priority at SBA as an essential defense-supporting industry. It could be assumed also that the industry would be sitting pretty for political reasons: Rep. William Hill (R., Colo.), chairman of the House Small Business Committee, an avowed friend of mining, introduced legislation creating the agency; William D. Mitchell, SBA's administrator, has a Utah and Colorado background and is thoroughly familiar with the mining and construction equipment industry.

Actually, however, small mine operators will find their lending prospects weak at SBA. For one thing, SBA can be expected to refer mining loan applicants to other agencies—DMEA for exploration and development loans, GSA for production loans. For another, mining's status as a high-risk, speculative enterprise still discourages the granting of standard government loans.

But small miners may be able to get valuable managerial aid from SBA. The agency has set up 30 field offices. For the Western mining states, there are offices in Denver, with jurisdiction over Colorado, Wyoming, Utah, and New Mexico; San Francisco, for California, Nevada and Arizona; Seattle, which includes Idaho; and Minneapolis, which includes Montana.

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REPRESENTATIVES IN FOREIGN COUNTRIES

PERSONAL NEWS

THREE APPOINTMENTS to executive posts in the United States Vanadium Co., a division of Union Carbide and Carbon Corp., have been announced by W. E. REMMERS, president. O. F. HOLMGREN (left) has been named executive vice-president; A. P. CORTELYOU, (center) vice-president; and H. L. McKINLEY (right) general manager. The three men have been serving the company as vice-president, general manager and general superintendent, respectively.

Parke A. Hodges, of Behre Dolbear & Co., is expected to return from Spain and Portugal about Nov. 15.

Samuel H. Dolbear and **Dr. A. F. Banfield**, of Behre Dolbear & Co., have been examining asbestos deposits near St. Odilon, Que., Can.

Nearly one-fourth of the men named to the University of Idaho research council, an advisory group for the university research program, represent the mining industry in the state. Those accepting appointments include: **John D. Bradley**, Boise, vice-president of Bradley Mining Co.; **R. D. Leisk**, Kellogg, general manager Sunshine Mining Co.; **C. C. Livingston**, Hailey, manager of Triumph Mine; **Harry D. Marsh**, Boise, secretary of Idaho Mining Assn.; **J. R. Simplot**, president, J. R. Simplot Co.; **Robert E. Sorenson**, Wallace, vice-president, Hecla Mining Co.; **L. E. Traeger**, Conda, a superintendent for Anaconda Copper; and **W. G. Woolf**, Kellogg, superintendent, Sullivan Mining Co. zinc plant.

C. A. Weekly, former chief metallurgist and director of the San Mauricio Mining Co., United Paracale Mining Co., and Coco Grove, Inc., and general superintendent and director of Itogon Mining Co., has resigned from Marsman & Co. after 20 years' service. Mr. Weekly is now in charge of Ore Dressing with A. Soriano y Cia., Manila, P. I.

William M. Armstrong, 38, associate professor of the department of mining and metallurgy at the University of B. C. at Vancouver, is the first Canadian to receive the $2000 teaching award of the American Society of Metals. Prof. Armstrong was to be guest of honor at the annual banquet of the ASM in Cleveland Oct. 21, when he and two American teachers were to receive the award.

R. N. Holme, formerly of the Phelps Dodge Corp., Morenci Branch, is now employed as an industrial engineer by the Titanium Metals Corporation of America at Henderson, Nev., in the technical department in charge of engineering for the magnesium recovery division.

James M. Kennedy has been elected chairman of the board of Revere Copper and Brass, Inc., succeeding the late **James J. Russell. Charles A. Macfie**, former vice president and general sales manager, has been named to fill the president's post vacated by Mr. Kennedy.

The formation of a consulting firm in connection with technical, legal and labor aspects of the Cuban mining business has been announced by **Dr. Jorge Herrera Morales**, president of Cia. General de Inversiones Sta. Lucia, S. A., located in Havana. Other officers of the new firm are: **Martin Lleras**, treasurer; **Dr. Amado Herrera**, secretary; **Manuel Alarcon Marcos**, general assistant; **E. Ruiz Williams**, director of engineering, and **Antonio Calvache**, engineering consultant.

Prof. Harold L. Walker, head of the Department of Mining and Metallurgical Engineering, University of Illinois, has resigned to become a partner in the M. & N. Engineering Co. The company, which Prof. Walker will serve as technical consultant, is reconstructing the entire mill of the New England Brass Co., Taunton, Mass.

The board of directors of Haile Mines, Inc., has announced the appointment of three directors. They are: K. C. Li, chairman of the Wah Chang Corp. and one of the world's authorities on tungsten; **Hugh W. Darling**, of the law firm of Guthrie, Darling and Shattuck, Los Angeles, and **Carlton D. Hulin**, formerly head of the geology department of the University of California and a consultant, under whose guidance the company's subsidiary, Tungsten Mining Corp., has been developed.

O. R. Bailey has been named chief construction engineer of Monsanto's phosphate division, at Anniston, Ala. Mr. Bailey, who has been maintenance superintendent at the chemical company's plant at Monsanto, Tenn., will be succeeded there by **Ralph Neubert**, former maintenance superintendent at the Anniston plant.

The Kings Mountain, N. C., operations of the Foote Mineral Co. has become "home" to **James E. Castle**, former assistant mill manager with the St. Joseph Lead Co., who has joined the operations as plant manager. He succeeds **A. B. Chandler**, who is now chief chemist at the Exton, Pa., plant. Joining Mr. Castle at Kings Mountain are **R. L. Lincoln**, control engineer, formerly of the Exton plant, and **William E. Gill**, a graduate of Rensselaer Polytechnic Institute, who will serve as an assistant in the geology department. **Tom L. Kessler**, formerly with Tennessee Coal and Iron division of the U. S. Steel Corp., has joined Foote Mineral as chief geologist.

George A. Mattson, who was with Anaconda Copper at Butte, Mont., has joined the engineering department of the M. A. Hanna Co. at Hibbing.

Hugh V. Alessandroni, former manager of research of the technical department of the titanium division of the National Lead Co., has been promoted to assistant technical director

A. C. RICHARDSON, who has had supervisory charge of research in mineral processing at Battelle Institute, Columbus, Ohio, for the past 20 years, has been named technical director.

of the division. He is succeeded by **Dr. R. W. Brickencamp,** former supervisor of development and engineering at the St. Louis plant.

E. R. Rowley has been named president of Titanium Metals Corporation of America, a subsidiary of National Lead and Alleghany Ludlum Steel. Mr. Rowley also becomes a director and member of the executive committee of Titanium Metals. He is succeeded as production manager of National Lead by **Philip C. Muccilli,** former assistant production manager.

Dr. George A. Kiersch has been appointed director of the mineral resources survey, Navajo-Hopi Indian Reservations, Ariz., for the University of Arizona, succeeding **Prof. E. D. McKee,** who resigned to join the USGS at Denver, Colo. Dr. Kiersch has been supervisor of the field operations since the start of the survey in June, 1952.

William M. Staples has been appointed manager of construction by Chemical Construction Corp., an American Cyanamid Co. unit, which designs and builds chemical plants.

Herbert E. Treichler, vice president of Texas Gulf Sulphur Co., has retired after more than 35 years of association with the company.

Keith Whiting, former exploration engineer in American Smelting and Refining Co.'s Western Mining Dept., has been placed in charge of the company's exploration office in Toronto, Can.

T. R. Wearing, former manager of Pamour Porcupine Mines, Ltd., Pamour, Ont., has become mill superintendent at Gaspe Copper Mines, Ltd., Murdochville, Quebec.

Arthur B. Van Tine has joined the staff of the Department of Geology at Rensselaer Polytechnic Institute, it was announced by **Dr. Paul E. Hemke,** dean of the faculty.

H. DeWitt Smith has retired as a vice president of the Newmont Mining Corp., it was announced, but will continue as a director. Mr. Smith has been named chairman of the O'okeip Company, Ltd., a South African copper producer, in which Newmont has an interest.

Eighteen retired professors at the University of Washington, including former deans or high-ranking professors in chemical engineering, electrical engineering, hydraulic engineering and mineral engineering, have formed a consultant service known as the Retired Staff Assn.

Members of the group include **Henry K. Benson,** chemical engineering; **Edgar A. Loew** and **Gordon R. Shuck,** electrical engineering; **Charles E. Weaver,** geology; **Charles W. Harris,** hydraulic engineering, and **Milnor Roberts,** mineral engineering.

The following promotions have been effected at Broulan Reef Mines: **Walter F. Brown,** manager in charge of

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mining operations; **R. F. Dewar,** general superintendent; **J. M. Girvan,** mine superintendent; and **Harry Pike,** assistant mine superintendent.

Stanford V. Smith, Jr., Hibbing, Minn., has succeeded the late **B. K. Dutton** as engineer for the mines of Republic Steel on the Mesabi.

Donald H. Olson, mining engineer, has been promoted to foreman at the Carlz Mine at Keewatin, owned by the M. A. Hanna Co.

Cyril A. Pederson, engineer at the Cooley mines of the Hanna Co., has become foreman at the Perry mine.

Ralph W. Marsden, Oliver Iron Mining Division geologist, has been promoted to manager of geological investigations of the company. **Norman A. Moberg,** assistant to the general mining engineer, has become manager of engineering.

WILLIAM E. WRATHER, director of USGS, and past president of AIME has been awarded the John Fritz medal for notable scientific achievement by unanimous choice of the 16-man board.

After serving as a mining engineer with Kennecott Copper at Ray, Ariz., **G. S. Hayden** has joined the Hanna engineering staff at Hibbing, as has **George A. Mattson,** formerly of Butte, Mont.

Woodrow Frost, Hibbing, has been appointed general pit foreman-trucks at Oliver Iron Mining's Sherman mine.

Arnold E. Hill, superintendent of underground properties, has succeeded **Hugh Leach,** now manager of Minnesota mines for Cleveland-Cliffs, as superintendent at the Hill-Trumbull mine at Marble.

P. V. Burgett, Eveleth, Minn., chief mining engineer for Oliver Iron's Eastern District, has retired. He is succeeded by **John T. Nolan,** former assistant chief mining engineer for the district.

Robert J. McKelvey, mine superintendent for the Lamaque Mining Co., Ltd., has been awarded a traveling scholarship by the Canadian Scandinavian Foundation.

Wayne W. Beebe, assistant superintendent at the Plummer Mine (Oliver Iron) at Coleraine, has been promoted to superintendent. He joined the Oliver organization in 1942 as a mining engineer.

C. Barnett, recently on the mill staff at Noranda Mines, has been appointed mill superintendent at Pamour Porcupine Mines, Ont.

D. E. Halter, former sinter plant foreman with Compania Metalurgica Penoles, S. A., in Torreon, Coahuila, Mex., has become an extractive metallurgist with the U. S. Bureau of Mines at Albany, Ore.

Vincent J. White, of Athens, Greece, is with the Northern Greece Gold Field Co.

Retirement of **Wallace D. Miracle** as California district manager for the Northwest Lead Co. has been announced at Seattle headquarters of the company. Mr. Miracle was with the Treadwell Gold Mining Co., Alaska-Juneau Gold Mining Co., the Treadwell-Yukon Co. and the Bunker Hill & Sullivan Mining Co. before joining Northwest Lead in 1920.

DONALD C. McGRAW

Donald C. McGraw has been elected president of the McGraw-Hill Publishing Co., Inc., succeeding his brother, the late Curtis W. McGraw. Mr. McGraw is the youngest son of the company's founder, the late James H. McGraw, Sr.

He has been associated with the company since 1919, when he became an advertising staff member of the magazine Chemical and Metallurgical Engineering, which has since become Chemical Engineering. He became a director of the firm in 1935 and, in 1945, a vice-president. During World War II, he was a consultant to the Publishing and Printing Division of the War Production Board.

Mr. McGraw is a graduate of Lawrenceville School and attended Princeton University. During World War I he served with the U. S. Navy.

Since 1933, when he was made company secretary and put in charge of production and manufacturing, he has been responsible for the handling of all contracts for printing and binding, engraving and paper supply for the entire McGraw-Hill operation. In 1945 he was named vice-president for manufacturing and general services, the position he has held until the present. He became a director of the McGraw-Hill Book Company, a company subsidiary, in 1950.

The Hon. Charles E. Greenlay has been named Manitoba's new minister of mines and natural resources. He succeeds **Hon. J. S. McDiarmid,** who resigned after 21 years of service in the department.

R. B. Graham, for the past ten years associated with the Quebec Department of Mines as geologist, has joined the staff of the Cyprus Exploration Corp., in Toronto.

Arnold S. Bunte, of Roswell, N. M., has been appointed associate professor of geology at the Colorado School of Mines for the 1953-54 academic year.

Weaver A. Solomon is general manager of the Round Valley mine near Bishop, Calif., for the Pinnacle Tungsten Co.

Oscar S. Straus has been elected president of the Theodore Roosevelt Association to fill out the term of Major General **Frank R. McCoy,** who resigned because of ill health. Mr. Straus is treasurer of American Smelting and Refining Co. and director of Revere Copper and Brass.

Newly assigned to Allis-Chalmers processing machinery department are **Owen Ayres, Van S. Brokaw** and **Fred J. Gerdes.** The men recently completed the company training program for graduate engineers. Mr. Gerdes, a graduate of the South Dakota School of Mines and Technology, becomes an assistant engineer in the department. He is a member of the American Society of Mechanical Engineers. Both Mr. Ayres and Mr. Brokaw are graduates of the Missouri School of Mines and Metallurgy and have joined the staff as service engineers.

Robert A. Stauffer, vice president in charge of research of the National Research Corp., recently announced

THOMAS M. WARE, vice president in charge of the Engineering division, International Minerals & Chemical Corp., has been elected a director of Dunlap and Associates, Stamford, Conn.

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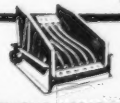
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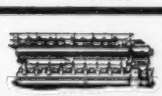
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DONALD H. McLAUGHLIN, San Francisco, president of Homestake Mining Co., was elected chairman of the American Mining Congress, which held its annual meeting in Seattle, Wash., in Sept. Mr. McLaughlin succeeded Robert M. Hardy, Yakima, Wash., president of Sunshine Mining Co.

the appointment of **John L. Ham** to the position of director of the Metallurgical research dept. He succeeds **James H. Moore,** who became general manager of the company's wholly-owned subsidiary, Vacuum Metals Corp.

Henry Hughes, editor of the Hanna Miner since the magazine's first issue in 1950, has been assigned to personnel and job evaluation duties. He is succeeded by **Bob Lyness,** formerly of Fargo, N. D.

Roger E. Ronning, civil engineer, is a new member of the Hanna engineering staff on the Mesabi range.

Charles R. Bird has been appointed pension plan administrator, Western Mining Divisions, Kennecott Copper Corp., it was announced by **J. P. Caulfield,** general manager.

Research engineer **Charles E. Greenlee** has been named assistant to the vice president of sales at Basic Refractories, Inc.

DANIEL P. EIGO has joined the staff of *E&MJ* as copy editor. A graduate of the New York University School of Journalism, Mr. Eigo comes to *E&MJ* from four years as assistant editor of an upstate New York daily newspaper. During World War II, he served in the South Pacific aboard a Navy Destroyer Escort.

Thomas K. Carson of Tacoma, Wash., has been named by Kaiser Aluminum & Chemical Corp. to be assistant purchasing agent for the reduction plant at Mead, Wash.

J. E. Nichols, director of industrial safety for the Reynolds Metals Co., Richmond, Va., has accepted membership on the board of directors of the National Society for the Prevention of Blindness.

Robert D. O'Brien, formerly superintendent of Highland-Surprise Consolidated Mining Co., has joined the staff of Eimco Corp. and has been assigned as assistant territorial supervisor of export sales, with headquarters in Tokyo, Japan.

OBITUARIES

Paul B. Lord, who retired as general manager of the Mexican Mining Dept. of American Smelting and Refining Co. in May, 1953, passed away Aug. 9 in Boston, Mass. Mr. Lord had been in ASARCO's employ for more than 44 years.

James J. Russell, a member of the board of the American Smelting and Refining Co. and chairman of the board of Revere Copper and Brass Inc., an ASARCO affiliate, died recently. Mr. Russell began his career in the mills and became a director of the company in 1952.

J. G. L. McCrea, president of Dome Exploration Co., vice-president of Dome Mines, director and general manager of Campbell-Red Lake Mines, and vice-president of Sigma Mines of Quebec, passed away at his home in Toronto Sept. 12.

The death of **Cecil Gordon Ross,** active for many years in the mining industry in Timmins and Kirkland, Canada, occurred recently at St. Catherines. Mr. Ross was in his 54th year.

William O. Tower, 64, consultant for the Ontario Department of Mines, died after a heart attack at his home in Toronto, Aug. 28. A prominent figure in Canadian mining, he had worked at most of the major mining centers of the area.

Prof. Charles G. Williams, prominent and much respected figure in Canadian mining, passed away Aug. 13. Prof. Williams, 71, suffered a stroke at his summer home in Muskoka and died at a hospital.

Roberto Luiz Restrepo, 71, noted mining engineer and fellow of the American Geographical Society, died Sept. 24 in Medellin, Colombia, of a heart attack.

Dr. Fred E. Wright, Canadian geologist, was interred at Mount Royal Cemetery, Montreal, Can., Aug. 29. Among his survivors is Charles Will Wright, a brother.

Fred W. Sommer, vice-president and treasurer of Mack Trucks, Inc., died Sept. 5, after a short illness.

George Dunn, 55, mine manager of Kirkland Lake Gold Mining for the past eight years, passed away suddenly after having apparently recovered from a serious illness which he had suffered in late August.

John Hocking, 56, Hibbing, Minn., died Sept. 21. He was superintendent of Minnesota mining operations for Republic Steel and a long time resident of Hibbing.

Joseph W. Ady, 71, prominent mining engineer, died at Colorado Springs, Colo., Sept. 29, after a heart attack. Mr. Ady was for many years associated with the Portland Gold Mining Co. at Cripple Creek and was also an officer of the Cresson Co., in that district.

E. B. Coolidge, 69, Great Falls, Mont., well known oil operator and mining man, died suddenly at the Rainbow Hotel, Great Falls, where he resided, on Sept. 29. At his death he was president of the Homestake Oil Co. and had formerly operated gold mines in the Gilt Edge district, Fergus County.

Charles A. Sheehan, 61, one of Northern Ontario's best known mine operators, died suddenly in the course of a visit to the head office of Cochenour Willans Gold Mines, of which he had been mine manager for the past four years.

John S. Dickson, 61, prominent Canadian mining executive and financier died in September. He was president of American Nepheline Ltd. and a director of Ventures, Ltd. and Nipissing Mines.

Clarence C. Lindeman, ore dispatcher for the M. A. Hanna Co., at Cleveland, died suddenly at his home in Mentor, Ohio, Sept. 27. He had been with Hanna Co. for over 35 years.

Lewis Buck, 77, mining and geology expert, died Sept. 27 at his home in Monrovia, Calif.

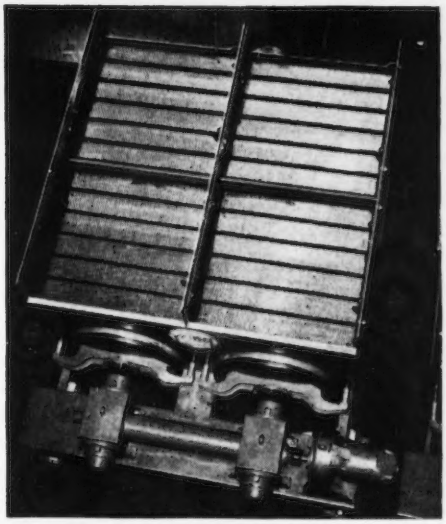
Philip C. Knapp, 84, secretary-treasurer of the Portugese American Tin Co., San Francisco, for 20 years, died Aug. 11 in St. Helena, Calif. Mr. Knapp, who retired in 1952, also had served as the secretary of Natomas Co., Sacramento, Calif., gold dredging firm, and as secretary-treasurer of Yuba Manufacturing Co., San Francisco, which manufactures dredging equipment.

CORRECTION

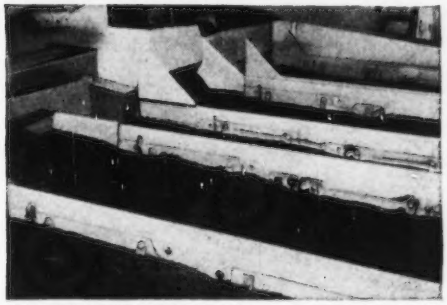
In the September issue of *E&MJ*, a personal concerning **Robert Devlin,** former consulting engineer for the mine financing firm of Robertson and Morgan, Ltd., erroneously stated that Mr. Devlin was manager of the Asbestos Corp. Ltd. He has been appointed manager of Cassiar Asbestos Corp. Ltd.

Long-wearing, rugged parts of U·S·S Stainless Steel help to assure uninterrupted operation of Yuba Mineral Jigs

YUBA CONSOLIDATED GOLD FIELDS' dredge number 20 is shown in operation at Hammonton, Calif.



TOP VIEW of a Yuba Mineral Jig showing four Stainless Steel screens each approximately 42" square.



A CONTINUOUS FLOW of muddy water passes over the screens of Yuba Mineral Jigs, as usable material is separated from refuse.

● The constant flow of water containing abrasive materials provides a severe test for resistance to wear and corrosion for mineral jigs—one of the important machines on placer mining dredges.

Yuba Manufacturing Company, San Francisco, Calif., has solved the combined problems of abrasion and corrosion by using U·S·S Stainless Steel for screens, diaphragm bands and hutch valve bodies. Yuba has been using U·S·S Stainless Steel in its jigs for more than six years and, company officials say, "they practically never wear out and none have been replaced as yet."

While rapid wear is induced by abrasive materials, corrosion is the factor that precludes the use of metals other than Stainless Steel. For instance, the rapid corrosion rate of carbon steel causes blinding of the screen openings, resulting in down time for cleaning or replacement. Dredges operating in far away places, such as Malaya, Alaska and Portugal must be built of parts and materials that will not require frequent replacements.

Stainless Steel's ability to resist both abrasion and corrosion make it highly suitable for many other jobs in the mining industry. You can reduce replacements and minimize shutdowns at key points in your equipment by replacing less durable materials with U·S·S Stainless Steel. If you would like more information relating to a particular application, write to United States Steel Corporation, Room 2817-E, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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U·S·S STAINLESS STEEL

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S-247

UNITED STATES STEEL

Elmhurst-Chicago Stone Company Report on
J&L Jalloy Heat-Treated Plate:

"Twice tne Wear ... No Downtime During Quarrying Season"

Faced with the problem of finding a long-lasting lining for their high-speed rock-crusher chutes, Elmhurst-Chicago Stone Company tried everything from rubber to high-carbon steel. Then, in 1949, J&L Jalloy Heat-Treated Plate was experimentally installed in 15% of the company chutes.

Today all worn out plates have been replaced with J&L Jalloy. Here's why. Jalloy lasted twice as long as the special abrasion-resistant steel chute liners previously used ... Jalloy lasted the entire quarrying season ... eliminated costly downtime for maintenance repairs. Finally, Elmhurst has taken further advantage of this modern J&L mining and quarrying steel by installing Jalloy liners in the company's truck beds.

If you have equipment like this that takes a real beating from impact and abrasion — J&L Jalloy Heat-Treated Plate can help you cut maintenance costs and increase service life.

Developed specifically by J&L for heavy duty applications, Jalloy is a heat-treated, fine-grain, manganese molybdenum steel with both yield strength and Brinell hardness 4 times as great as mild steel. As a result, J&L heat-treated Jalloy lasts 4 times as long as mild steel — yet costs only twice as much.

One of the roll crushers. Its high speed introduced tough impact and abrasion problems which have been solved with J&L Jalloy chute linings.

The 70-year-old quarry of Elmhurst-Chicago Stone Company.

THIS MONTH IN MINING

World Bauxite Reserves Described By Lipkowitz

IN SHARP CONTRAST to some other metals, the reported ore reserves of the aluminum industry are larger today than at any time since commercial production of the metal began 65 years ago.

Lipkowitz

This statement opened the talk by Irving Lipkowitz, assistant to the president, Reynolds Metals Co., given before a recent meeting of the New York Local Section, AIME.

"Total world reserves currently are estimated at 2.4-billion tons," Lipkowitz said (see accompanying table). "At the beginning of World War II, world reserves were estimated at half as much, ranging from 800-million to 1.2-billion tons."

Lipkowitz pointed out that, "About two-thirds of the present world reserves are in the free world areas and about one-third are located in Russia and other Iron Curtain countries. At the 1952 rate of mining," he added, "these world reserves would last close to 200 years."

Pointing out that aluminum is the earth's most plentiful metal—accounting for 8% of the earth's crust down to a depth of 10 miles—Lipkowitz said that ". . . the fundamental problem is one of bringing the earth's aluminum-bearing minerals into the commercial ore category.

"The industry," Lipkowitz said, "has been accomplishing this in two ways:

"1. Intensive exploration for commercially high-grade ores;

"2. Constant improvement of processes to make lower grades of ore commercially usable."

Bringing the discussion closer to home, Lipkowitz said that United States experience since the beginning of World War II illustrates how the industry itself "creates" new ore reserves. In 1941, estimated United States reserves of commercial ore totaled 18.2-million tons. At that time, the industry was not using any ore with more than 7% silica.

During World War II, he continued, improved processes were adopted with the result that ore containing as much as 15% silica is now used commercially.

"As a result, although 22.5-million tons of bauxite have been mined since 1941, United States reserves are currently estimated at 40-million tons. In effect," he added, "the growth of the industry since 1941 has created 44.3-million tons of new reserves."

In addition, Lipkowitz said, vigorous efforts have been made since the beginning of World War II to develop commercial processes for extracting aluminum from clays.

Huge Clay Reserves

The reserves of high aluminum-containing clays in the United States alone amount to almost 3-billion tons, or more than the total world reserve of bauxite, the speaker stated.

In response to an audience question, Lipkowitz took an unrehearsed look into the future at possible uses of atomic energy in aluminum smelting. We use natural gas, Lipkowitz commented, because hydro facilities require such a tremendous capital outlay which must be amortized over decades. Why should we tie-up our future? In a few years, atomic energy may be used on a competitive commercial basis and smelting plants may be located close to ore supplies.

Bauxite—World Reserves and Production

(Reynolds Metals Co., Economic Research Department)

Figures in Thousands of Metric Tons

Country or Territory	Reserves	Mine Production 1951	Mine Production 1952
North America—Total	**50,000**	**1,878.3**	**1,693.8**
United States	50,000	1,878.3	1,693.8
Canada	(a)	.....	.....
Caribbean and South America—Total	**629,000**	**4,725.2**	**5,952.1**
Brazil	150,000	19.0	(b)
British Guiana	65,000	2,034.9	2,426.3
French Guiana	10,000	.....	.....
Haiti & Dominican Republic	30,000	.....	.....
Honduras	(a)	.....	.....
Jamaica	315,000	.....	350.0
Surinam	57,000	2,671.3	3,153.8
Colombia	(a)	.....	.....
Venezuela	2,000	.....	.....
Western Europe—Total	**306,000**	**1,971.3**	**2,343.5**
Austria	2,000	7.8	15.2
France	100,000	1,124.4	1,115.0
Greece	60,000	197.1	348.6
Italy	10,000	174.0	281.5
Jan Mayen Island (Arctic Circle)	27,000	.....	.....
Northern Ireland	(a)	.....	.....
Spain	7,000	10.6	6.0
Turkey	(a)	.....	.....
Germany	(a)	(b)	.....
Yugoslavia	100,000	453.4	577.2
Africa—Total	**300,000**	**134.7**	**189.4**
French West Africa	50,000	.....	109.8
Gold Coast	230,000	131.4	75.6
Mozambique	(a)	3.3	(b)
Nyasaland	20,000	.....	.....
Sahara Desert	(a)	.....	.....
Tanganyika	(a)	.....	.....
Asia and Oceania—Total	**331,500**	**725.6**	**648.1**
Australia	20,000	5.2	7.3
Caroline Islands	3,000	.....	.....
Formosa (Quemoy Is.)	(a)	10.0	(b)
Iran	15,000	.....	.....
India	250,000	68.1	(b)
Indonesia	25,000	642.3	560.7
French Indochina	1,000	.....	.....
Malaya, Federation of	15,000	.....	22.1
Pakistan	500	.....	.....
Palau Islands	2,000	.....	.....
Free World—Total	1,616,500	9,435.1	10,862.9
Russia and Satellites—Total	**798,000**	**1,548.9**	**1,974.1**
China	338,000	.....	.....
Hungary	370,000	(b)	(b)
Poland	.....	.....	.....
Rumania	40,000	(b)	(b)
U.S.S.R.	50,000	(b)	(b)
World—Total	2,414,500	10,984.0	12,837.0

(a)—Bauxite deposits reported. Size of reserve unknown. (b)—Production included in estimate of world total.

Private Firms Make Atomic Energy Studies

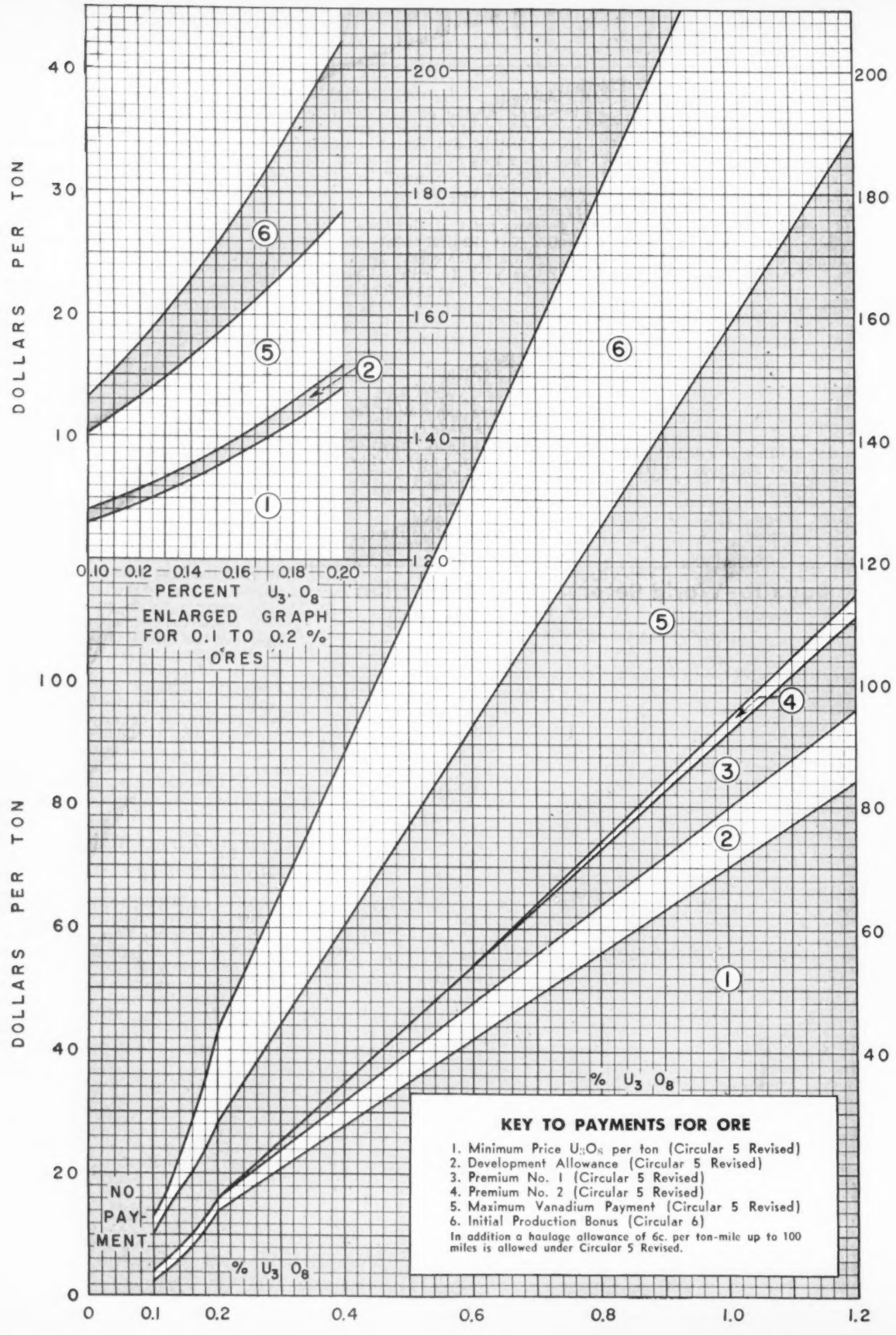
ATOMIC ELECTRIC PROJECT conducted by Union Electric Co. of Missouri and Monsanto Chemical Co. has completed its initial study phase and joint sponsorship of the project has ceased, the firms announced.

This study reportedly revealed a reactor of the sodium-cooled graphite-moderated type has promise. Preliminary ideas on its design also were developed.

Duquesne Light Co., Pittsburgh, and Walter Kidde Nuclear Laboratories Inc., Garden City, Long Island, are to make a nuclear power reactor study, including a survey of the feasibility of design, construction and operation by private industry of power-producing reactors.

Meanwhile, it was announced in New York that Bechtel Corp., San Francisco engineering firm, and four electric companies will make a study of nuclear energy.

AEC Uranium Ore Prices In Domestic Circulars No. 5 (Revised) & No. 6



AEC Extends Uranium Prices

THE U. S. Atomic Energy Commission has extended the expiration date of the guaranteed minimum price schedule for uranium ores of the Colorado Plateau area, and also has extended the time during which initial production of uranium ore from new domestic mines will be eligible for bonus payments. The actions were taken to encourage the production of uranium from domestic sources.

Attention Uranium Miners

AEC POINTS OUT that certain uranium mining claim holders have only until Dec. 10 to obtain benefits provided by Public Law 250.

Public Law 250 provides that, subject to certain limitations and reservations, a mining claim located under mining laws subsequent to July 31, 1939, and prior to Jan. 1, 1953, on land included within a prior lease, application or offer for a lease under the mineral leasing laws shall be effective to the same extent as if the mining claim had been located on lands open to location under the mining laws.

To obtain benefits of this law, the owner of such mining claims is required, not later than 120 days from Aug. 12, to: (1) post an amended notice of location of mining claims, stating that such notice is filed in accordance with provisions of this Public Law; (2) file for record such notice in the office where the certificate or notice of location of such claim is recorded.

The Commission's Domestic Uranium Program Circular 5, Revised, has been extended to cover the period through March 31, 1962, from its previous expiration date of March 31, 1958. This circular, which went into effect on March 1, 1951, provides guaranteed minimum base prices for the uranium oxide content of carnotite-type and roscoelite-type ores of the Colorado Plateau area. The price schedule ranges from $1.50 to $3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances.

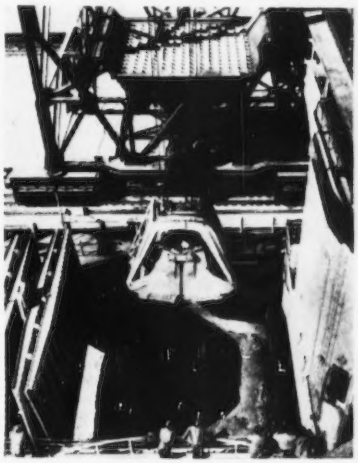
Domestic Uranium Program Circular 6, which established a bonus for initial and certain other production of uranium ores from domestic mines delivered under its terms between March 1, 1951, and Feb. 28, 1954, now has been extended through Feb. 28, 1957.

For eligible new mining properties, bonus payments are made on each pound of uranium oxide in acceptable ores delivered to qualified mills or Commission buying stations up to and including the first 10,000 pounds of uranium oxide. For eligible mining properties which produced less than 10,000 pounds of uranium oxide during the period from April 9, 1948, to March 1, 1951, bonus payments are made on the difference between 10,000 pounds of uranium oxide and the number of pounds sold between April 9, 1948, and March 1, 1951.

Bonus payments range from $1.50 to $3.50 per pound of uranium oxide in acceptable ores produced from eligible mining properties, depending on the grade of the ore. Thus, the maximum bonus which may be obtained from production of new mines ranges from $15,000 to $35,000.

Bonus payments are made directly by the Commission and not by the receiving station or mill, and are in addition to purchase payments made pursuant to ore buying schedules. Before bonus payments are made, the producer must make application to the Commission, and the Commission must certify that the mine is eligible for the bonus.

Copies of Circular 5, Revised, and Circular 6 may be obtained from the Commission's Grand Junction Operations Office, Box 270, Grand Junction, Colo., or from other Division of Raw Materials' offices of the Commission. *(See graph on opposite page.)*



NEW RECORD for unloading foreign iron ore reportedly was established recently at Curtis Bay Ore Pier, Baltimore, when a 20,560-ton cargo of ore from the Bomi Hills deposit in Liberia was unloaded in 13 hrs., 55 mins. Pictured is Blaw-Knox 200 cu. ft. ore bucket used in unloading

Mining Calendar

Northwest Mining Association, Davenport Hotel, Spokane, Dec. 4-5.
Colorado Mining Association, Shirley Savoy Hotel, Denver, Jan. 28-30
AIME National Convention, Hotel Statler, New York City, Feb. 18-21

News Highlights

Canadians have the same rights as Americans under Alaska mining laws, according to Attorney General J. Gerald Williams. **Page 134.**

Two more important companies have adopted the "split check" method of operation at their Coeur d'Alene properties to meet higher costs. **Page 138.**

Pilot plant of the new $5-million Indian Creek mine-plant of St. Joe Lead Co. in Missouri is expected to be conducting test operations with development ore within the next few weeks. **Page 152.**

Six New Mexico Mine-Mill leaders were brought nearer to jail sentences by a state Supreme Court ruling. **Page 159.**

Construction is progressing rapidly at the mammoth Hanna interests' project at Nickel Mountain in Oregon. **Page 159.**

U. S. Bureau of Mines has released a graph showing gold production in the United States and Alaska from 1901 to 1952. **Page 162.**

Sherritt Gordon Mines expected to be operating a part of its nickel-copper concentrator at Lynn Lake by the beginning of this month. **Page 164.**

Argentina's Direccion Nacional de Mineria has resumed exploration at Agua Tapada, important gold and manganese deposit. **Page 168.**

U. S., German and Japanese firms reportedly have indicated interest in high grade iron deposits along a section of Chile's coast. **Page 170.**

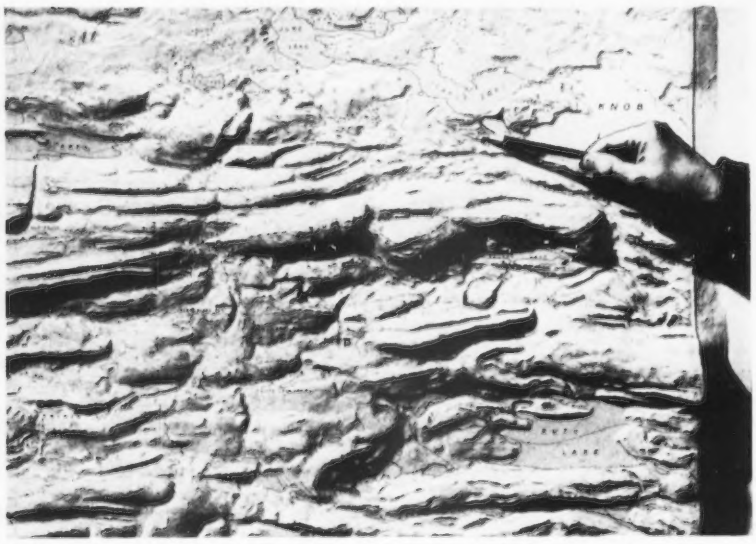
British Titan Products Ltd. reportedly is backing a prospecting team searching for ilmenite in Cambia, Africa. **Page 173.**

Japan's three aluminum smelters plan to produce 52,600 metric tons of aluminum next year. **Page 180.**

Canadian Aluminium Co. representatives have arrived in Greece, reportedly to weigh the possibility of refining locally-produced bauxite on the spot. **Page 184.**

Special report on Iron Ore Company of Canada's gigantic Knob Lake project in Labrador by McGraw-Hill's Cleveland Bureau. **Page 188.**

WORLD'S HIGHEST TV COMMUNITY is at Climax, Colo., home of Climax Molybdenum Corp.'s operation. Townsite is saddled atop the Continental Divide, 11,400 ft. above sea level. Three antennas are implanted atop Mt. McNamee (see arrow), which soars to 13,770 ft. At climax there are 2,000 inhabitants, 1,200 of whom are mine workers. All of the 500 residences are to be wired for television by the end of this month. Climax is spending about $90,000 on the project to make Climax a more pleasant place to live. Programs are picked up from Denver, 60 air miles away. Project involves 2½-mi. of coaxial cable, about a mile of which was strung through the mine itself in Bartlett Mt. (on the left). The mine is second largest underground operation in the world and the largest known deposit of molybdenum. To install the antennas, every kind of tool, piece of equipment, water, cement and a 10-gage steel shack (to house the amplifying system) was taken up to the top of Mt. McNamee via a 1,200 ft. aerial tram. To install the antennas, workers fought snow, glacial ice, lightning and rugged mountain climate for four months.



PORTION OF NEW RELIEF MAP, one of 30 produced by Aero Service Corp., Philadelphia, for Iron Ore Company of Canada shows Ruth Lake-Fleming area in Labrador at a scale of 1 in.-1,000 ft. with a vertical exaggeration of 2-1. Map is based on topographic information from aerial maps by Canadian Aero Service Ltd., Ottawa. Formed of Vinylite, the map weighs only 1½ lbs. It is to help the ore company plan the Labrador development.

THE BOSTON MAN
IN 1953

IN PORTLAND, OREGON . . .
L. F. Childers
Goodyear Rubber & Asbestos Co.

IN CAMBRIDGE, MASS. . . .
Benjamin A. Greene
The Greene Rubber Company.

IN NEW ORLEANS, LOUISIANA . . .
L. C. Deckbar
Woodward, Wight & Co. Ltd.

* L. F. Childers, Goodyear Rubber & Asbestos Co., 205 Northwest Fifth Avenue, Portland 9, Oregon (Phone Atwater 8575), a BOSTON distributor since 1915, supplies quality rubber products to lumber and allied industries in Oregon and Southwest Washington.

* Benjamin A. Greene, The Greene Rubber Company, Broadway at 6th St., Cambridge, Mass. (Phone Kirkland 7-7655) is a leading New England specialist in industrial rubber products. Climbing sales, doubled in ten years, attest industry's confidence in this well-known BOSTON distributor.

* Woodward, Wight & Co. Ltd., New Orleans (9), La. (Phone Tulane 2471) was founded in 1867. L. C. Deckbar's 465 employees service New Orleans and the South out of six modern warehouses, furnish industry in the South with top-quality BOSTON rubber products.

See the Boston Man in your area. Check your Classified Directory or write Boston Woven Hose & Rubber Co.

THE BOSTON MAN
IN 1880

THE BOSTON MAN who calls on you puts 1352 factory experts to work for you!

"The Boston Man" is the unsung hero of many industrial emergencies. A belt breaks down—a hose is damaged by falling rock—a special type of conveyor belt is needed in a hurry to meet a contract deadline . . . these are industrial emergencies met by "the Boston Man" with efficiency, for all necessary facilities are immediately available to him.

Boston's streamlined organization—from development laboratory to factory, through the distributor to the job—assures versatility, inventiveness and on-the-job efficiency of service as well as product.

Boston Woven Hose & Rubber Company has a long history of producing everything from V-belts to garden hose, quarter-mile-long conveyor belts and heavy-duty hose to stair treads and floor matting.

Long-time skilled employees, with their hard-won experience, join with research chemists and engineers trained to meet the latest demands of industry for industrial rubber products.

Be sure to call our distributor in your area. He is your "Boston Man."

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BOSTON WOVEN HOSE & RUBBER CO., Box 1071, Boston 3, Mass.

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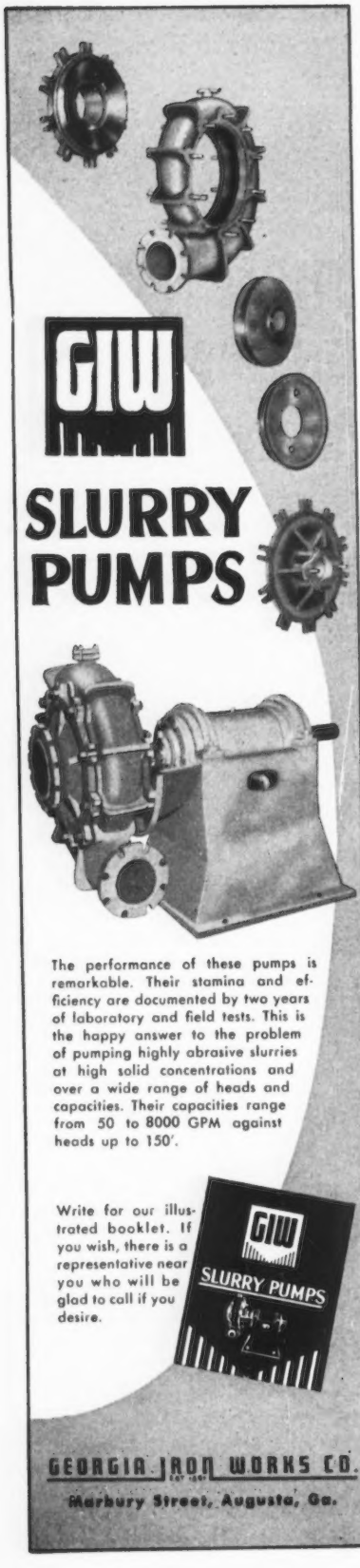
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SLURRY
PUMPS
The performance of these pumps is remarkable. Their stamina and efficiency are documented by two years of laboratory and field tests. This is the happy answer to the problem of pumping highly abrasive slurries at high solid concentrations and over a wide range of heads and capacities. Their capacities range from 50 to 8000 GPM against heads up to 150'.
Write for our illustrated booklet. If you wish, there is a representative near you who will be glad to call if you desire.
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GEORGIA IRON WORKS CO.
Marbury Street, Augusta, Ga.

IOC Takes $1-Million Option On Bush Pilots' Iron Discovery

IRON ORE COMPANY of Canada reportedly has paid $15,000 for a 70-day option on a 400-acre iron ore claim discovered by two pilots flying over Labrador.

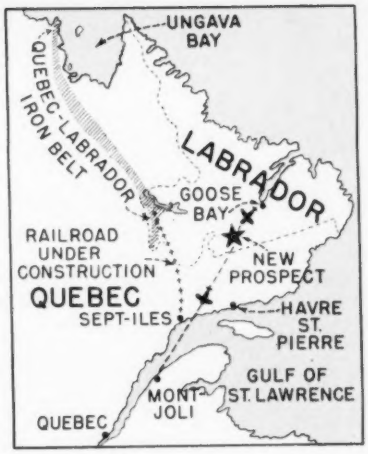
If the company exercises the option, it is to pay some $1,215,000 at the rate of $45,000 per year for the next 27 years. Company geologists and engineers are now making surface surveys.

The pilots, Paul LaPointe and William Awatter, both of Quebecair, Inc., were on a routine flight from Goose Bay to Mont-Joli when they made the discovery, 80 mi. north of Havre St. Pierre.

"Our plane compass went screwy and we figured there was some iron down there," LaPointe said.

He and Awatter rented a seaplane and returned to the area, 400-mi. east of Quebec City, for samples. Then they called in Dr. Steve Malehersick, a geologist, "when we needed someone with experience." All three will share in whatever money is received.

The discovery goes back to July,



"Our compass went screwy"

LaPointe explained. He and Awatter staked out 20 claims covering 400 acres. One estimate placed the amount of the deposit at 50-million tons of high grade iron ore at least.

Iron Ore Company of Canada already has mining concessions in the Ungava interior, 300-mi. north of Sept.-Iles. The company is constructing a railway into the interior over which ore is expected to roll next year.

Reynolds Begins Developing Haiti Aluminum Reserves

REYNOLDS MINING CORP., wholly-owned subsidiary of Reynolds Metals Co., has begun a multi-million dollar project of developing its aluminum ore reserves in Haiti.

This was announced by Richard S. Reynolds, Jr., metals company president, following the return of Walter L. Rice, mining corporation president, from conferences with President Paul Magloire of Haiti.

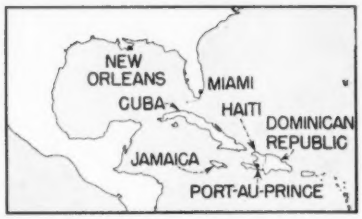
Reynolds

Rice

Principal deposits are near the port of Miragoane, some 80 miles from Port au Prince. Rice said that a natural protected harbor provides deep water facilities which will accommodate the largest modern self-unloading ore carriers.

The deposits are five miles from deep water and extend along a plateau about 2,500-3,000 ft. above sea level. Rice added that the project will cost several million dollars.

Construction equipment has been sent to Haiti to prepare the shore site and to build a 12-mi. mountain road



descending from 3,000 ft. Drying and loading facilities will be installed at the shore and a pier is to be built for loading all types of ore carriers, it was added.

The company now gets bauxite from Arkansas, Jamaica, British Guiana and Dutch Guiana.

New Titanium Process Firms Seek DMPA Loan

MONSANTO CHEMICAL CO. of St. Louis and National Research Corp. of Boston late last month were negotiating with DMPA for a loan for a plant to make titanium by a new process.

AEC Picks Westinghouse To Build Atomic Plant

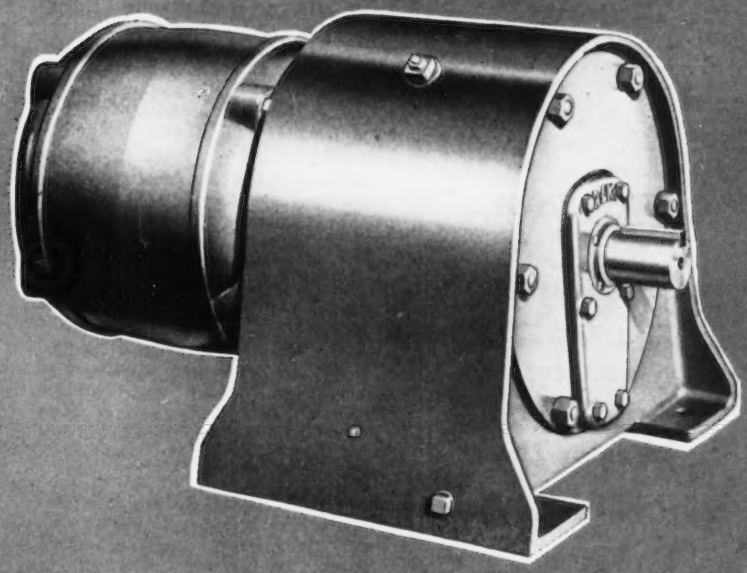
AEC HAS CHOSEN Westinghouse Electric Corp. to construct the first full-scale atomic power plant in the United States. It is hoped that the 60,000 kw. reactor will be operating in 3-4 years. Location selected was not announced.

Announcing the *–Newly Designed–* Integral

ALL-STEEL FALK Motoreducer

(Gearmotor Type–Supplementing Falk All-Motor Line)

. . . with completely standard round-frame, D-flange motor



Check and Compare these features...

Meet a faithful old friend in a new, modern dress! The famous, time-proved Integral Type *all-steel* Falk Motoreducer (Supplementing Falk All-Motor Line) has been redesigned into a compact, streamlined unit providing the utmost in space economy—but retaining all the application versatility, long-life performance, easy-maintenance features and superior structural qualities that have made Falk Motoreducers the recognized standard throughout industry.

In this new Integral unit—rated in accordance with AGMA standards—a *completely standard* round-frame, D flange NEMA motor is mounted directly on the all-steel Motoreducer housing. The motor remains a separate piece of equipment, readily replaceable with any other type or make. Output speed (ratio) can be changed within unit's torque capacity without modifying motor. Size and arrangement of the standard housing permit wide ratio range—from 3.36:1 to 542:1.

In order to meet the greatest number of industrial application needs, the newly designed Integral Motoreducers are available in horizontal and vertical models, both in concentric and right-angle types; double, triple and quadruple reduction; horsepower range, 1 to 40 HP. Prompt stock shipment in standard ratios is offered.

Whatever your reduction requirements, you get greatest dollar-for-dollar value in the long run by standardizing on Falk products. Write for Bulletin 3104.

Every FALK Motoreducer has these "In-built" Factors—

Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

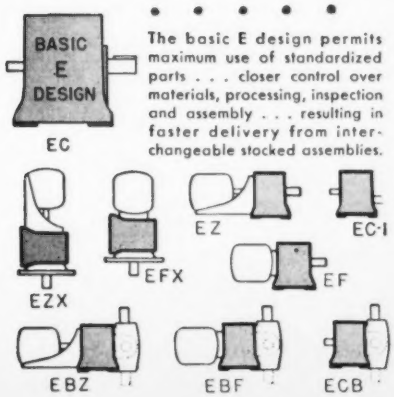
All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Sealed Housings. Dual closures and one-way vents keep oil *in*, dust and moisture *out*. Units are splash-proof, leakproof, dustproof.



The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.

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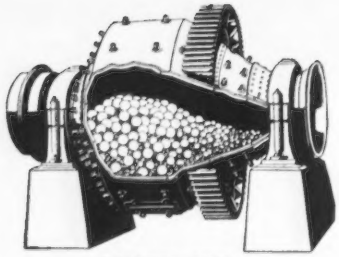
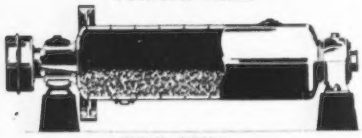
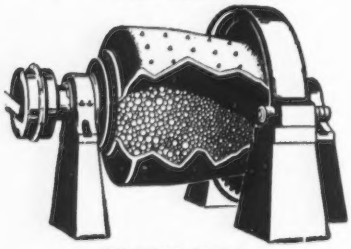


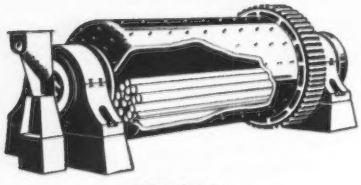
CONICAL MILLS



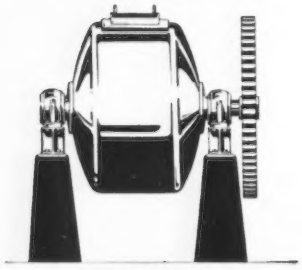
TUBE MILLS



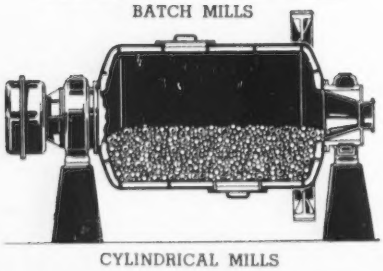
TRICONE MILLS



ROD MILLS



BATCH MILLS



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IN THE U. S.

ALASKA

• **Canadians have the same rights as** Americans under Alaska mining laws, according to a legal opinion submitted by Attorney-General J. Gerald Williams to mining commissioner Phil Holdsworth.

The commissioner asked for the ruling because, he said, the U. S. Bureau of Land Management had refused to let Canadians claim land for mining purposes in Alaska.

The attorney-general upheld Holdsworth's contention that a reciprocal agreement exists between Alaska and Canada which gives Alaskans the same rights as Canadians in Canada and vice versa. He cited statutes of both Alaska and British Columbia in support of his opinion.

• **Alaskan Associates Ltd.,** which operates the Big Hurrah gold mine in the Nome district, expects to continue work through the winter. Pumps installed have eliminated the difficulty with water. It is expected operations with 15 to 20 men will continue for several years.

• **Quebec Metallurgical Industries** has 15 men doing exploration work on the Klukwan iron deposit near Haines. Samples are being taken out for testing of both alluvial and lode.

• **A report from Juneau** says there is more mining activity in Aaska this year. The Territorial Bureau of Mines is advising prospectors to search for copper, tin, nickel, cobalt, asbestos, tungsten, manganese, molybdenum and titanium. Among the activities listed are the following: Kenai Chrome Co. is planning to begin mining and shipping of 2,500 tons of chrome ore this year. It is working on Red Mountain, near Seldovia; Bear Creek Mining Co. has four men doing exploratory work on Orange Hill deposit and has finished an air strip east of Nabesna River, near its head. DeLano Mining Co. is working on a tunnel at Radovan copper property in the Nizina area.

• **In the Nome area,** U. S. Tin Corp. is working on its lode tin deposit at Lost River, on Seward Peninsula with plans for full production soon. It is employing 125 men, according to Kenneth Kadow, vice-president and general manager. A 4x10 rod mill and a cone crusher are being installed, also 10 new concentrating tables, and the mill capacity is being doubled. A $150,000 water system is under construction and 8 duplex housing units are being constructed. About 25 tons were going through the mill in Aug.

• **Texas Gulf Sulphur Co.** has representatives looking in southeastern Alaska and the Prince William Sound district for iron pyrite deposits as a source of sulphur.

• **U. S. Bureau of Mines** has completed about 6,000 ft. of diamond drill-

ing on the Snettisham magnetite deposit.

• **Alaska Tin Corp.** has moved into Ear Mountain area on Seward Peninsula. DMEA will assist in exploration for placer tin on Tuttle and Kreuger creeks.

ARIZONA

• **Tests running** to 5-6% copper on a 26,000 yield to date are reported for the Pima Mining Co. claim being worked in the San Xavier and Mineral Hill district south of Tucson. The claim covers 275 acres and is believed to be one of the few virgin copper deposits found in the state in the past 15 years. Herbert Hoover, Jr. heads the mining company.

• **New Jersey Zinc Co.** has negotiated a contract with Verde Exploration Ltd. for the further exploration of properties owned or controlled by Verde in the Jerome mining district.

The Jerome district, located about 25 mi. northeast of Prescott, where New Jersey Zinc has an exploration office, was formerly an important mining district because of the location there of two large copper mines, the United Verde and the United Verde Extension. Both mines have largely been worked out, United Verde Extension ceasing all operations in 1939 and United Verde ceasing copper mining in 1951.

Although considerable exploration work has been done in the areas near the mines, there remains much more work to be carried out in a promising zone located 3½ mi. southeast of Jerome. The company will concentrate its attention here, utilizing all applicable exploration techniques.

CALIFORNIA

• **A 44% increase** in quicksilver production for the fiscal year ended June 30 over the previous year was reported by New Idria Mining and Chemical Co., with executive offices in San Francisco. President Gordon I. Gould told stockholders recovery of quicksilver from the firm's mine near Hollister rose to more than 8 lb. per ton, compared with 5.7 lb. per ton during the previous year. The mine is now producing about 300 flasks a month at $188 a flask, Gould said.

On October 27 it was announced that Charles F. Parker, Jr., had been elected New Idria president. Parker, formerly vice president-general manager of Telluride Mines Inc., succeeded Gould, who resigned.

• **More than 300 chromite deposits** have been found in the northern sections of the Sierra Nevada, Sierra, Yuba, Butte and Plumas Counties.

A study of California's chromite resources is found in Bulletin 134, "Chromite in California," by Garn A. Rynearson of the U. S. Geological Survey. A new chapter in the study

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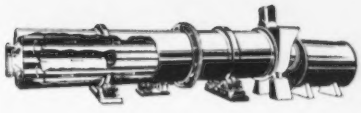
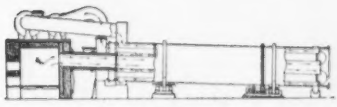
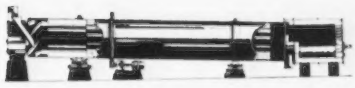


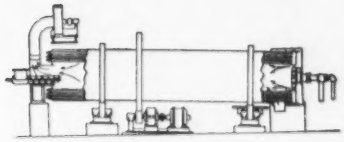
DOUBLE-SHELL SEMI-DIRECT HEAT DRYERS



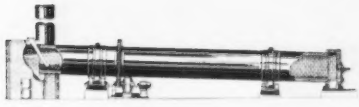
DOUBLE-SHELL INDIRECT-HEAT DRYERS



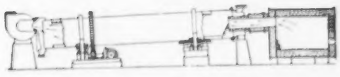
SINGLE-SHELL DIRECT-HEAT COUNTERFLOW DRYERS



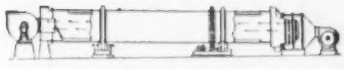
STEAM-TUBE INDIRECT-HEAT DRYERS



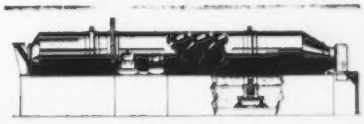
ROTARY KILNS



SINGLE-SHELL DIRECT HEAT PARALLEL-FLOW DRYERS



SINGLE-SHELL DIRECT HEAT HOT AIR DRYERS



ROTARY COOLERS

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California *(Continued)*

discloses that California's chromite deposits yielded about 32,000 long tons of ore by the end of 1949. Nearly half that amount came from Placer County.

COLORADO

• **Bear Creek Mining Co.**, exploration subsidiary of Kennecott Copper Corp., has started a diamond core-drilling program in the Bonanza district, Saguache County. A machine on the surface will drill to perhaps 1,200 ft. in the search for lead-zinc mineralization under the supervision of W. I. Burgin, Bear Creek's Colorado exploration geologist.

• **Harry Morgan of Dolores,** prospecting the Meadows country between Dunton and Rico, has reported a uranium strike. Surface samples are said to have assayed 1.56%.

• **V. A. Robinson** has located a number of promising lead, zinc and silver claims at Carson, near Gunnison, not covered by the old patents. An ore shoot was opened just below grass roots and a permanent working shaft started on the old Yankee Boy claim. Picked samples reportedly assay over $1,000 per ton and a small shipment of mine run netted a small dividend, the first in many years from this camp.

• **A $3,300,000 mine-to-mill** uranium access road program in southwestern Colorado is virtually completed. Hundreds of uranium mining properties are reached as a result of the Federal-state program.

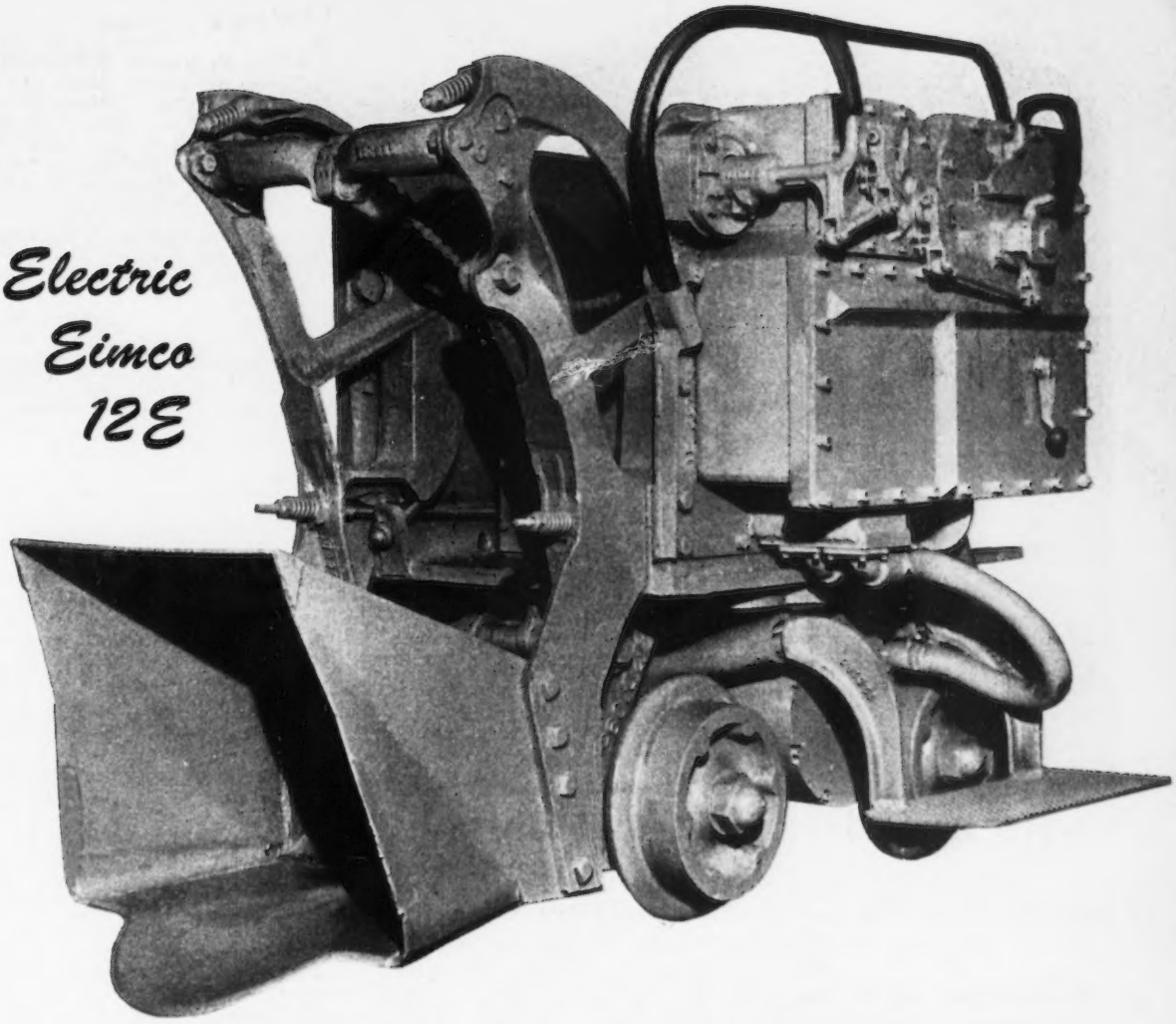
• **Golden Cycle Corp.** reported that the shaft for its uranium operation at Uravan, Colo., has reached a depth of 300 ft. The objective is 600 ft. Production is expected to begin by the end of the year.

• **Resurrection Mining Co.** at Leadville again is operating its custom mill with nine employees. Plans for the Resurrection include the lowering of pumps in Helena Shaft in Iowa Gulch to unwater the shaft. Future operations at the Resurrection will depend on the success of exploratory work which will be undertaken when the shaft is unwatered. Morton McKay will be in charge of all Resurrection activities.

• **Minerals Engineering Co.** of Grand Junction has contracted to sink the new vertical shaft for the Shattuck Denn Mining Co. near Uravan, Montrose County. The new vertical shaft will be sunk on the recently awarded Shattuck Denn, Atomic Energy Commission lease on Club Mesa west of Uravan.

• **Resurrection Mining Co.** at Leadville has started a long-range exploration program in the gold-copper camp at Summittville. Diamond drilling will be done to learn mineralized content of veins.

Electric Eimco 12E



Another first in underground loading equipment by Eimco. Here, for the first time, is a small mechanical loader with electric motors and controls as rugged as the air powered models that have been standard mine equipment in all mining districts of the world for many years.

The 12E gives the same high performance speeds, the same efficient operation, the same ease and convenience for the man on the machine as previously known on air-powered models.

This machine is presently available for AC operation in all voltage ranges. Motors and controls are totally enclosed, sealed against all outside contaminants. Machines can be supplied for permissible explosion proof specifications when required.

Great care has been exercised in the design and construction of these machines in order that no function of the machine or no movement of the operator would be different than that of the air powered equipment.

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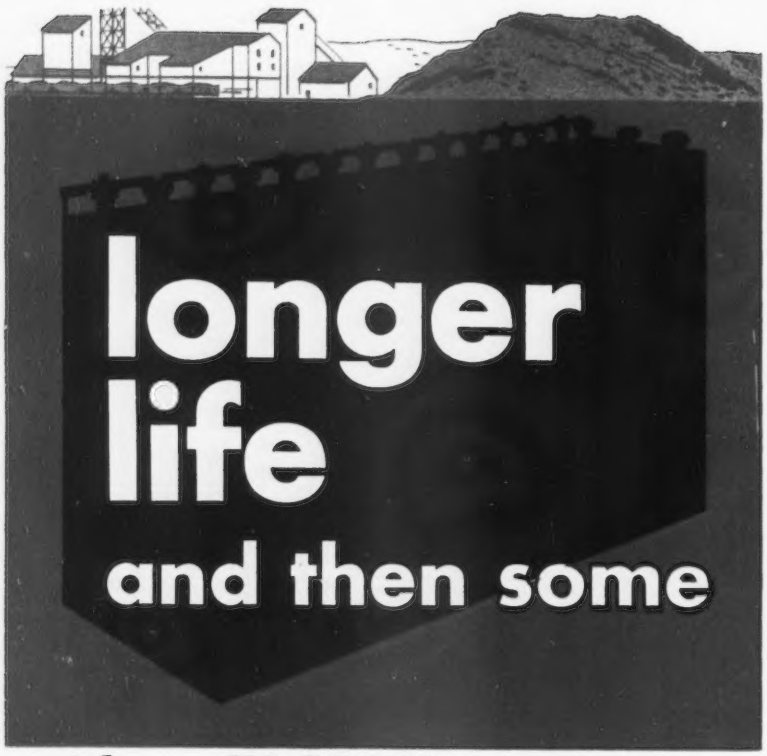

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Colorado *(Continued)*

● **Wm. M. Muchow & Associates** of Chicago will resume mining and milling at the Chain O'Mines group in Gilpin County. Muchow explained that the huge tailings dump would be remilled at the rate of 200 tons daily. Carl Skagerber is superintendent.

● **American Smelting & Refining Co.** has suspended underground development work at its Keystone Mine in Gunnison County. All work is now directed toward completion of the 200 ton per day differential flotation lead-zinc mill. Nolan Probst is in charge of the work.

● **Al Beebe**, manager, reports that work on the pocket of the new 2,200 level of the Cresson Mine at Cripple Creek is nearly completed and that they will now begin slabbing out the station. Prior to the completion of the Carlton drainage tunnel in 1939, the Cresson could be mined no deeper than the 1,700 level without use of the Ajax pumps which drained the mine to the 1,200 level. The shaft can now be sunk to about the 2,500 level before reaching the tunnel level. The company is now stoping on 2,100.

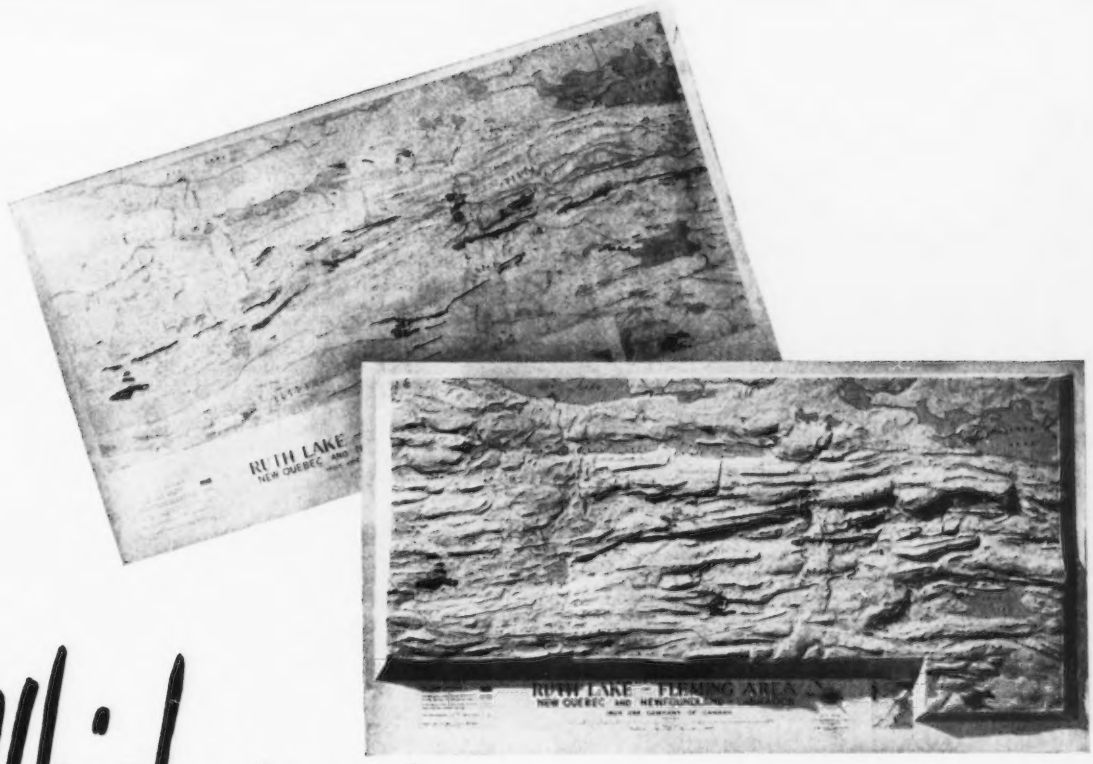
● **United States Geological Survey** has established a large camp in Gypsum Valley, Montrose County. The survey has started diamond drilling for uranium-vanadium ore in the upper end of the valley which was recently withdrawn for mineral entry. Vic Fischer of Grand Junction is in charge of the USGS uranium investigations on the Colorado Plateau.

● **At Mountain Springs mine** of Rico Argentine Mining Co. approximately 100 tons of lead-zinc-silver ore are mined daily and trucked three miles to the company's differential flotation mill. The St. Louis tunnel is being reopened and diamond drilling is underway. The tunnel is being retimbered with steel sets made from 45-pound railroad rail from the abandoned Denver & Rio Grande Southern railroad. Rico Argentine continues to be one of Colorado's major basemetal producers. Sherman B. Hinckley is president and general manager.

● **Hecla Mining Co.** got half a million dollars for its one third interest in Resurrection Mining Co. at Leadville. Buyer was Newmont, which previously purchased U. S. Smelting's one-third interest for a like sum and now is sole owner of the Resurrection mine, partly shut down due to low lead-zinc prices. Counting dividends, Hecla received $178,000 more than its original investment of $643,000.

IDAHO

● **Both Nabob Silver-Lead Co.** and Highland-Surprise Consolidated Mining Co. have adopted the incentive leasing, or "split-check", method of operation at their properties in the



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Formed in durable plastic, the relief map weighs less than 2 pounds, though its size is 58 x 31 inches. Cost of the relief map? Less than $5,000 for 30 copies, including printing in 3 colors.

Basic topographic information for the model was taken from aerial topographic maps made earlier by our affiliate, CANADIAN AERO, from photographs available for the development area, at a cost of several thousand dollars. Geologic data was provided by the Iron Ore Company of Canada.

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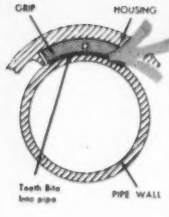

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Idaho *(Continued)*

Pine Creek area of the Coeur d'Alene Mining District in an effort to meet the problem of higher labor costs resulting from the new wage contracts negotiated last Aug. Practically all production has been turned over to leasers. Company operations largely are confined to exploration and development.

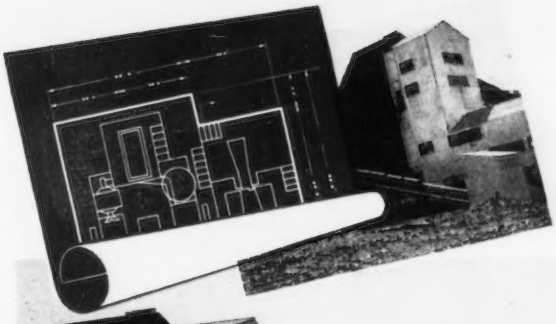
Incentive leasing was introduced into the Coeur d' Alene District by the Spokane-Idaho Mining Co. and later put into effect by Day Mines Inc., at its Tamarack Mine. As the "split-check" name indicates, it provides for a 50-50 split of profits between the leaser and the company, with the leaser supplying the labor, powder and small tools, and the company furnishing the compressed air and the necessary mining equipment, it was reported.

• **New Rainbow Mining Co.** has nearly completed the job of reopening old lower workings of the Weber Mine in the Lakeview District of Pend Oreille County. Only a small cave-in near the footwall of the vein remains to be cleared to permit access to an orebody from which ore was shipped when the property was last operated, in the early 1920's.

• **Kootenai Dike Mines Inc.**, has made substantial progress and reports good results from exploration work this summer on a recently-acquired group of seven patented claims and a patented mill-site adjoining its other extensive holdings in the Moyie-Yaak District of Boundary County. Surface trenching on one of the claims has exposed a vein structure 45 ft. wide to a depth of 50 ft. and further exploration of the structure by diamond drill is now in progress. Another of the claims is being developed by underground work and present indications are that early production can be expected. Kootenai Dike firm is headed by Dr. Ray E. Currie of Oakland, Calif.

• **Jeanette Creek Mining & Development Co.** has been organized with a capitalization of $300,000 to develop and bring into production a large deposit of silica in Idaho County, about a mile north of Bergdorf. Incorporators were Earl Chilcott, James G. Towles, Robert M. Gammell, all of Kellogg, and Larry E. Duncan of Sweet Home, Ore.—all partners in ownership of the property.

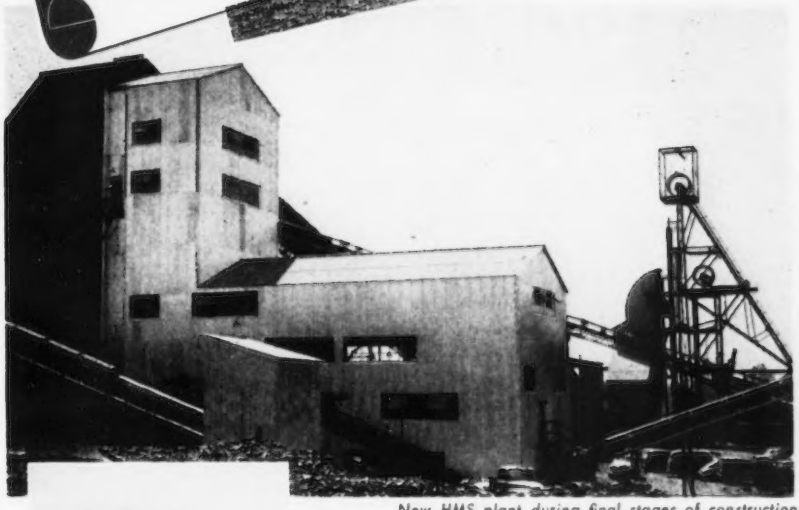
• **Two promising showings** of radioactive ore have been discovered in the Montana-Idaho mountains by Clarence D. Nelson, veteran miner and prospector who left retirement in Spokane, Wash., last spring to try his hand at uranium prospecting. Favorable Geiger counter reactions were obtained on the dump of the old Keith Mine in Mineral County, Mont., about four mi. west of St. Regis and at an aplite dike outcropping which Nelson had noticed in earlier prospecting days on Trail Creek in Boundary County, Idaho.



from PLAN to PLANT

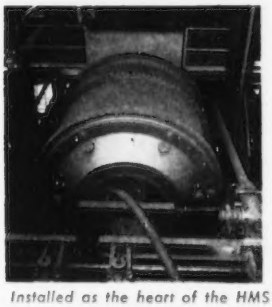
another WKE job completed

Built to order for iron ore washing, this Heavy-Media Separation plant is another major project recently completed by Western Knapp Engineering. Now in operation in Alabama, this HMS plant has an ore capacity of 400 LTPH. Of total plant feed, 300 LTPH is crushed and sized to 3" x ¼" for HMS treatment in a Wemco Drum Separator. The 100 LTPH of fines is washed and dewatered, then combined with HMS concentrate.



New HMS plant during final stages of construction.

View of plant during early phases of construction.



Installed as the heart of the HMS plant was this Wemco Drum Separator

WKE participation on this project included responsibility for all engineering and design, material procurement and construction. Its successful completion represents another example of the integrated plan-to-plant service offered by WKE to operators in the mineral dressing field.

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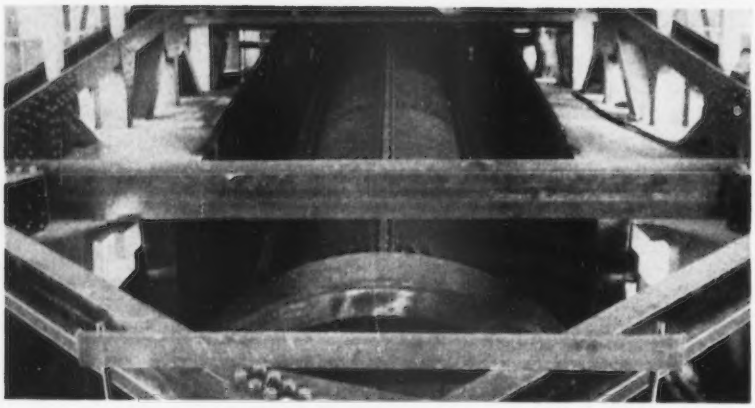

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Idaho *(Continued)*

● **Inspiration Lead Co. Inc.,** Wallace, has taken a 60-day option on the Oro group of 12 unpatented claims in the Yaak Mining District of Lincoln County in order to examine the property and determine whether it merits extensive development. Option includes the right to take over development and operation of the property under a long-term profit-sharing agreement. Al Osburn, Kellogg, did extensive work on the claims during the past year and has exposed showings which indicate excellent possibilities for copper, lead and silver.

● **Swansea Mines Inc.** has opened a substantial body of good gold-silver-copper milling ore on the No. 4 level of its Silver Bell property according to C. L. Hewitt, president. About 130 ft. of average grade milling ore, running up to $30 a ton, has been exposed by drifting and the widest part of the vein, where exposed on the No. 3 level 400 ft. higher, still lies about 180 ft. ahead of the face, he said. Plans for installation of a mill are under consideration.

● **Polaris Mining Co.** has started work on opening a new 3200 level in the New Purim area west of its Silver Summit Mine. The 3200-level west drift in Silver Summit is being extended westerly toward the projected downward extension of two ore shoots which are now being developed on the 3,000 ft. level in the New Purim area. Before the work was started a raise was run from the 3200 to the 3000 level in the most westerly ore shoot in Silver Summit ground in order to provide better ventilation on the lower level. The raise is reported to have been in good silver-copper ore all the way. The New Purim area is jointly owned by Polaris, Hayden Hill Consolidated and Lincoln Mining companies. Silver Dollar Mining Co. holds a long-term lease on the interests of the latter two firms and is paying a share of the cost of the Polaris development.

● **Circ Twins Mining Co.** of Orogrande, Idaho, has announced plans for mining the old Petsite gold property in the Orogrande District of Idaho County by low-cost, open-pit methods. The property contains a large acreage of gold-bearing rhyolite-porphyry.

● **Stockholders of** Princeton Mining Co., Eastern Lead Corp. and Fortune Mining Co. have approved a consolidation of their adjoining properties in the Pottsville area east of Mullan under the Princeton firm and an offer by one of the large operators in the Coeur d'Alene District to explore and develop the merged area on a profit-sharing basis is now under consideration.

The merged area is just 60 ft. less than two mi. long and has three known vein systems striking through its entire length, one of them the Deadman's Gulch shear, a major mineralized structure.

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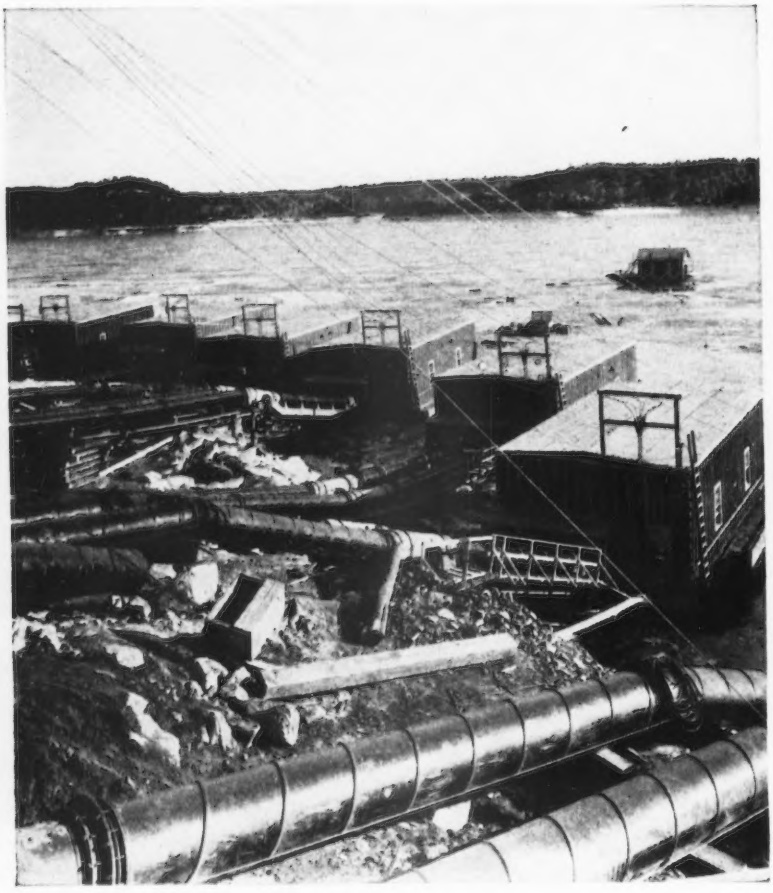

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Idaho *(Continued)*

• **Lookout Mountain Mining & Milling Co.'s** long south exploration crosscut from the 1,200-ft. level of the Sunset Minerals shaft has entered a zone of well-mineralized stringers about 1,800 ft. from the shaft station. In the last 100 ft. the crosscut has intersected numerous veins and veinlets of quartz and siderite up to 6 in. wide containing sulphides of copper, lead and zinc. The main objective—the Lookout lead vein which yielded rich ore from upper workings—lies about 500 to 600 ft. ahead of the present face.

• **Lucky Friday Silver-Lead Mines Co.** has opened rich silver-lead ore on its new 2,300-ft. level which is 300 ft. below lowest previous workings. A south crosscut from the offset shaft cut the vein about 185 from the shaft station, exposing a six-ft. width of mineable ore, including about 18 in. of solid high-grade galena. Drifting to determine the length of the ore shoot is now in progress. On the 2,000-ft. level the ore was continuous for 1,000 ft.

• **Idaho Titanium Co.** has commenced operation of its new magnetic separator at Weiser and is producing monazite, ilmenite, zircon, garnet, fine gold, quartz and magnetite. Concentrates running from 6 to 25% monazite are being obtained from the K. & D. Dredging Co.'s operation at Ruby Meadows in Idaho County.

• **California interests** have organized Fairfield Mining Co., to explore and develop a 1,400-acre placer property along the South Fork of the Boise River in the upper Boise Basin in Camas County. The property, including buildings, drilling machinery and other equipment, was acquired from Arthur E. Uhl and Thomas H. Mellen. First exploration work will consist of drilling 50 holes to a depth of 60 ft. to test the ground down to bedrock.

• **American Smelting & Refining Co.'s** Morning Mine, at Mullan, was closed down Oct. 3 after 70 years of production. It was closed because of increased cost of labor and supplies, low lead-zinc prices and dwindling ore reserves.

• **Plans are underway** for a development program between the Silver Buckle Mining Co. and the Vindicator Silver-Lead Mining Co., both of Wallace, to sink a two-compartment vertical shaft on Vindicator property at least 800 ft. deep.

Silver Buckle reportedly will furnish all necessary capital to accomplish this work and it reportedly agrees to supply matching funds for a proposed $250,000 DMEA loan to Vindicator. DMEA approval of the loan was pending.

Shaft sinking was to begin in the near future. Profits from all minerals produced reportedly are to be evenly divided between each company. W. J. Logus is president of Vindicator. Dr. F. E. Scott is president of Silver Buckle. Logus and Jay Bettles, of

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Idaho *(Continued)*

Wallace, were said to have been instrumental in bringing about the development program.

ILLINOIS

● **Settlement of strikes,** which have kept most major producers in the Ill. fluorspar district shut down for varying periods recently, has been reached in all of the plants.

Increased hourly wage rate and other benefits were granted. Ozark-Mahoning Co.'s mill employees, returned to work October 8 after being on strike since August 1.

Negotiations of a new contract, granting an 8½¢ increase across the board, prevented work stoppage at Aluminum Co.'s fluorspar plant, Rosiclare. Minerva Oil Co., shut down from Aug. 1 to Sept. 18, allowed a 13¢ increase plus a 1¼¢ increase on insurance premiums on a 40-hr. week. Rosiclare Lead and Fluorspar Co.'s employees, on strike from Aug. 1 to 15, idling 180 men, were given a 6¢ hourly raise plus an incentive bonus on production.

● **Employees of Victory Fluorspar Co.** voted union affiliation, and a contract was signed by management and District 50, UMWA.

● **For production of** ceramic grade fluorspar, Minerva Oil Co., purchaser of the Crystal Fluorspar Co., has installed a new flotation plant at the Crystal Mine for treatment of fines from their sink-float plant. Operation started Sept. 1.

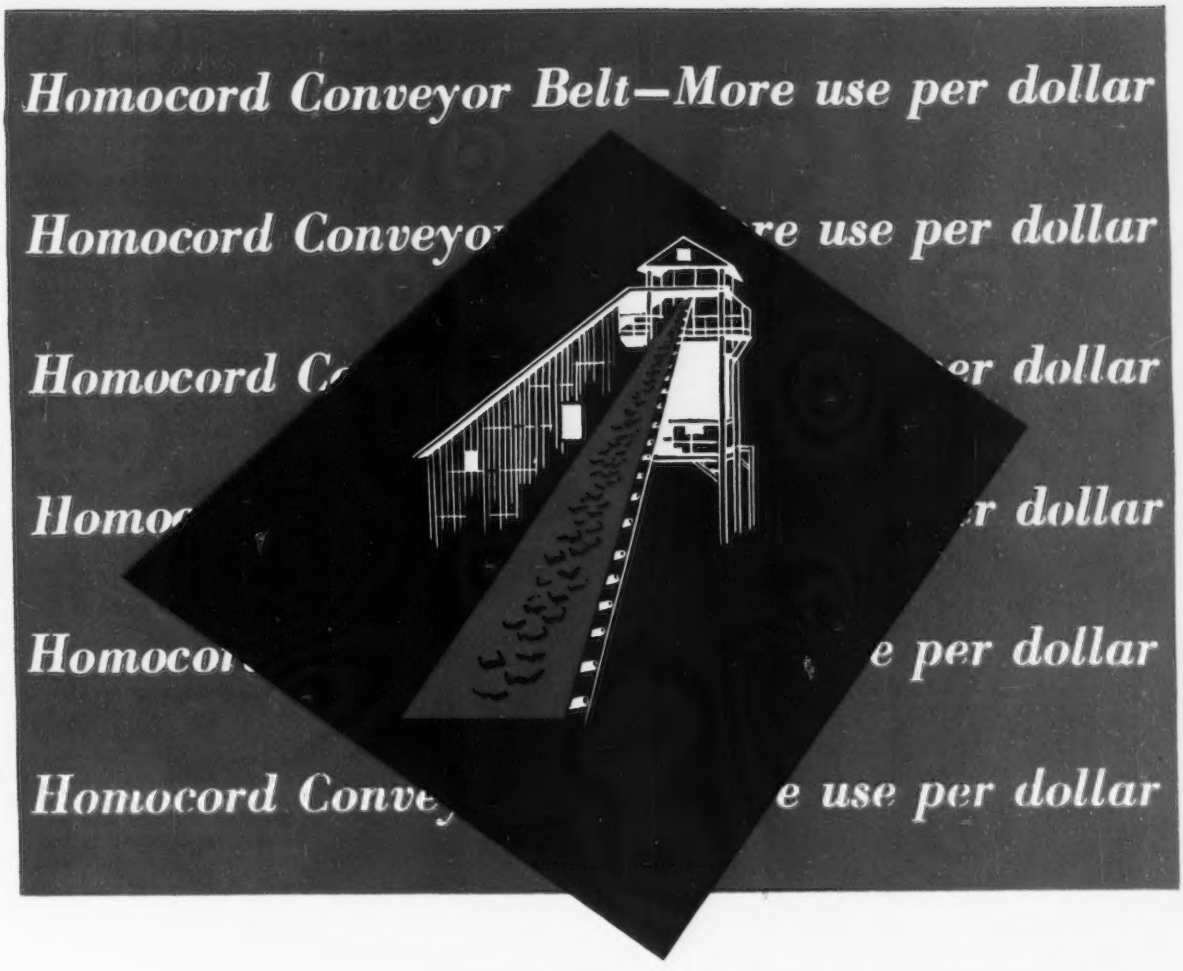
● **James W. Patton & Sons,** contractors, recently completed construction of a 710-ft. shaft for Ozark-Mahoning Co. on the Oxford fluorspar tract, five miles north of Cave-in-Rock in Hardin County. A new 150-ft. shaft on the Scott fluorspar property in Pope County also is being sunk by Patton & Sons.

KENTUCKY

● **S. D. Loyd and Allen Tinsley,** operating on lease the Nancy Hanks fluorspar mine, near Salem, Livingston County, have found a 12-ft. vein, averaging 90 effective units—mine run—on the floor of the 250-ft. level. They are sinking a winze from 250 ft. to 300 ft. and will cut a drift from that level. The Nancy Hanks is one of the oldest and best producers in the Ky. field and was reopened in 1952 after years of idleness.

● **Kentucky Fluorspar Co.,** Marion, is sinking a new shaft at the Wright mine, barite and fluorspar producer, near Lola.

● **The old Silver-Royal Mine,** Livingston County, originally developed in 1880 for its silver values carried by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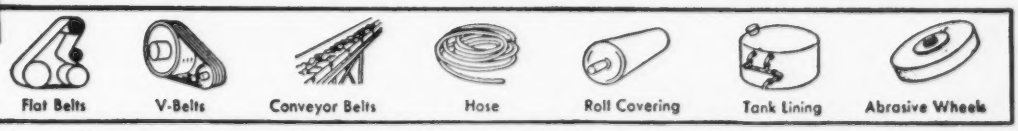

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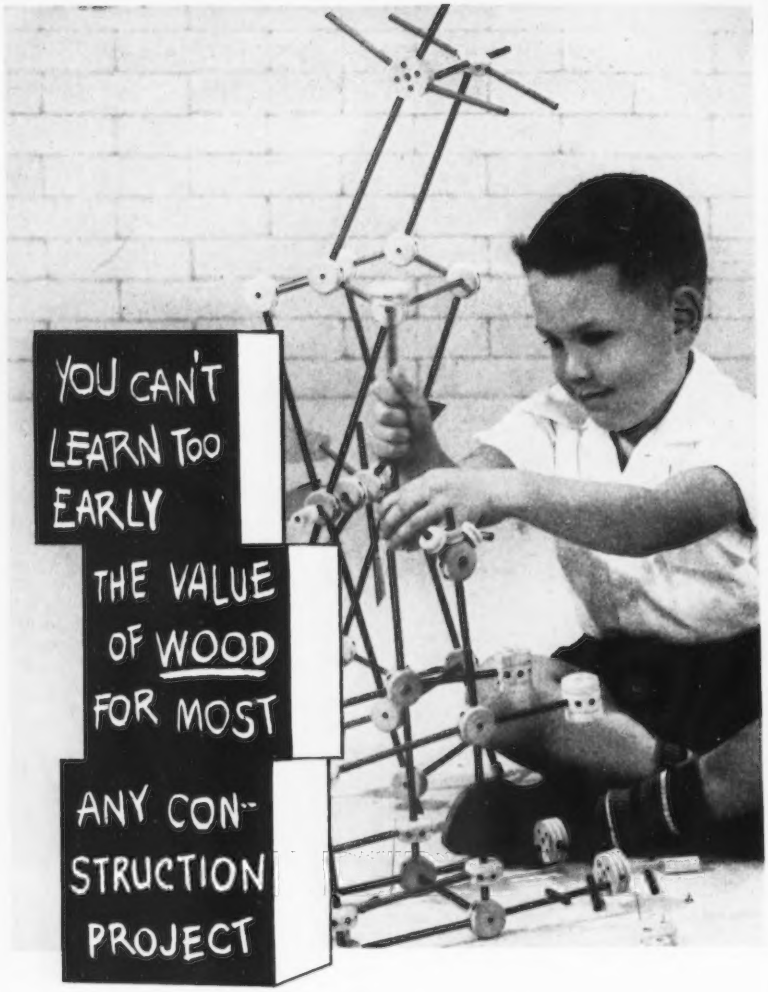

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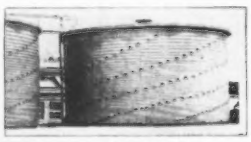

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Kentucky *(Continued)*

galena and reopened last year by Aluminum Company of America, Fluorspar Division, for fluorspar production, is now considered a "lost" mine. The Cumberland River, shifting its course, has completely flooded it through the cavernous formations in the limestone. Operators began construction of a new 500-ft. shaft last year. All work now has been abandoned.

MICHIGAN

● **Loomis Mine** of Pickands, Mather & Co. on the Gogebic range, shipped its first ore in Aug. Its ore is hauled from the bottom of the pit to the loading pocket by 15 heavy duty trucks with a one mile round trip haul.

● **Palms shaft** of P. M. & Co. loaded the last car of ore from its stockpile Aug. 5, after nearly 40 years of shipping. Most of the ore was hoisted from the Palms shaft on March 24, 1951, but a small stock remained until this year. The Palms shaft was begun in 1912 and the first skip of ore was hoisted in 1914. The Palms was the main hoisting shaft for the Anvil-Palms mine and will be maintained as an auxiliary outlet, for ventilation and for handling supplies and materials. Present ore hoisting is being done through the Euclid shaft which was acquired in Nov., 1950.

● **North Range Mining Co.** has completed drilling at the old Atikokan mine east of Sepawe, Ontario, where it has had two drills at work.

MINNESOTA

● **Pickands, Mather & Co.'s** Tioga No. 2 mine, farthest west mining operation on the Mesabi Range, is being stripped for an open pit. Located between Twin and Pokegama Lakes, in a new area, the quantity of water that must be pumped is difficult to determine.

● **Pacific Isle Mining Co.** expects to ship about 500,000 tons during the present season. The ore will come from nine different properties.

● **Mining Sub-Section** of the Minnesota Section of the AIME met in Virginia, Sept. 23rd. S. A. Frellsen, director, State of Minnesota Division of Waters, spoke on plans for water conservation and on what will be required of the mining companies in the way of cooperation—such as providing means to store water during spring break-ups, even a sufficient amount to continue a supply through several years of sub-normal rain fall.

● **At the Morton Mine** of the M. A. Hanna Co., the 1150 B. dragline and conveyor are still operating 21 shifts

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Twin Disc Truck-Type Torque Converters save not only engines, but brakes, axles, transmissions, clutches — they keep engines operating in their most efficient range; start heavy loads smoothly; provide firmer traction; reduce shifting and pedal braking; prevent fatigue . . . promote operator efficiency.

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Minnesota *(Continued)*

per week with a 7½ cu. yd. shovel also removing stripping 10 shifts per week. The old concrete shaft, which was put down to ledge about 40 years ago under compressed air, has been blasted out and a 3500 gpm pump has been installed in the shaft, it was reported.

● **Weggum Mine,** opened in 1914 as the Philbin underground mine by the Oliver Iron Mining Co. and operated by them until 1925, was converted to an open pit in 1943. Now operated by the M. A. Hanna Co., about 11-million cu. yds. of surface and rock stripping has been removed. Up to Aug. 1, 1953, total open pit shipments of ore have amounted to 5,784,000 tons of which some 1,800,000 tons have been shipped this season. The mine is efficiently and modernly equipped. with a screening and crushing plant in the pit. The washing plant is on surface near the edge of the pit and is fed from stock-pile by underground feeders and conveyors, through tunnels.

● **Under a Minnesota law** passed in 1947, which has never before been invoked, three Minn. mining companies have requested the State Executive Council to have five iron ore leases converted to less expensive taconite leases. Failing this, they would probably be obliged to cancel the ore leases. The companies making the request are: The W. S. Moore Co. of Duluth; the Pacific Isle Mining Co. of Hibbing; and Rhude & Fryberger of Duluth. The W. S. Moore Co. application refers to the Kinney and Kinney-Scotch mines at Kinney on the Mesabi range and the Syracuse mine on the Cuyuna range; that of the Pacific Isle Co. to the Smith mine near Hibbing; and Rhude & Fryberger's to the Seville mine at Kinney. Minimum rental for iron ore leases is $1,250 for the first year and $5,000 per year thereafter. For taconite leases the figures are $400 and $1,600.

● **Minnesota Ore Division** of J. & L. Steel Corp. will divert the Prairie River east of Grand Rapids for a length of about 2,100 ft. with a maximum distance of 300 ft. between the present river channel and the new one. Purpose is to facilitate mining operations at the Lind-Greenway property. When mining is completed, the river will be returned to its original course.

● **Some Mesabi range washing plants** already have closed down for the season. Most of the others are prepared to do so with the first below-freezing weather. Many of them have stock-piles of ore concentrates which are sufficient to continue shipments for the remainder of the season. The stock-piles are accumulated during the shipping season when railroad cars are not available. Only a handful of washing plants continued in operation at press time.

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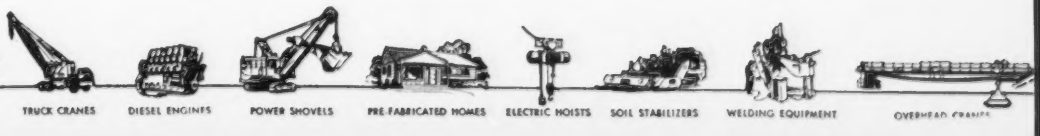

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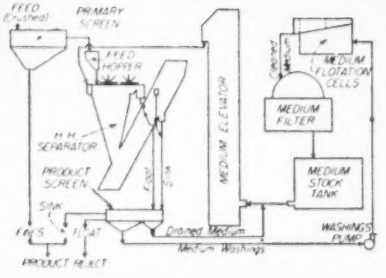

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MISSOURI

● **New $5-million Indian Creek mine plant** of St. Joseph Lead Co., 10 mi. northwest of Potosi is expected to have its pilot plant operating with development rock soon.

Construction has been underway for two years. There is a circular shaft, concreted from top to bottom. The hoisting engine has a 600 hp. motor and skips which carry ore from the mines to the surface are eight-ton capacity.

The mill, said to be one of the most modern in the world, boasts a capacity of 2,500 tons every 24 hours. Metallic lead content will run about 4%.

Water for the plant is supplied by gravity from a 2-million gallon reservoir. Concentrates from the plant are to be hauled by tractor-trailer trucks of 19-ton capacity to Potosi and shipped by rail from Potosi to the Herculaneum Smelter.

Plans call for another shaft to be sunk east of the present one. This auxiliary shaft will serve as a means of getting supplies to the underground operation and also as a relief shaft in case of a failure in the main shaft.

Main shaft, No. 23, is some 1,000-ft. deep; the relief shaft is to be about 750 ft.

MONTANA

● **American Chrome Co.,** controlled by Goldfield Consolidated Mines Co. of Reno, Nev. and San Francisco, is now mining and milling about 500 tons of chrome ore per day at its Mouat Mine, near Nye, Stillwater County. Daily output will be increased to 1,000 tons by Jan., according to Estey A. Julian, president of American Chrome. The company employs over 200 men. John Bley is manager.

● **Saxon Mining Co.** has been organized in Idaho by Clarence D. Nelson of Spokane. The company has taken over the old Keith property, about 4 mi. west of St. Regis, Mineral County, to prospect for uranium, which has been found on dump material at the mine.

● **Coronado Copper & Zinc Co.,** wholly-owned subsidiary of Cyprus Mines Co. of Los Angeles, has closed its Butte office and has ceased work for the present on the properties of the Blue Bird Consolidated Mining Co., located in the southwest portion of Butte, near Rocker, Silver Bow County. Mostyn G. Grant, formerly in charge of the Butte office, is now stationed at Wallace, Idaho. Coronado has taken over the Mineral King group of 32 unpatented claims, consisting of the Tarbox and Meadow Mountain groups 3 mi. north of Saltese, Mineral County, and is surface developing the latter with a bulldozer. Federal Mining & Smelting Co., about a year ago, leased the Mineral King group, but cancelled the

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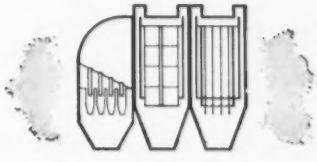

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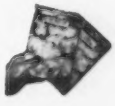

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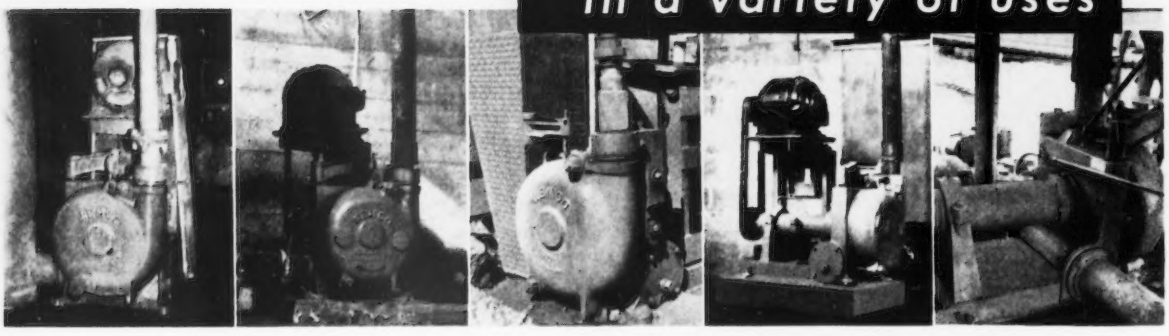

- **MILL TAILINGS** — The reliability of Wemco Sand Pumps keeps mill rejects moving to the settling ponds without interruption.
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- **CONCENTRATES** — Enclosed inlet chamber permits Wemco Sand Pumps to handle concentrates without frothing or airlocking. Material high in solids is easily pumped.
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Capacities — Wemco Sand Pumps are furnished in nine basic sizes with capacities ranging from 20 gallons per minute to 3,600 gallons per minute.

Discharge Head — The Wemco can pump against a total vertical head (fluid rise and friction) as high as 100 feet, with special applications of the 8" and 10" sizes as high as 130 feet. Pump speed for any particular application is determined by the head required.

Pulp Conditions — A complete range of pulps from slimes and slurries up to very coarse, highly abrasive mixtures can be handled. Up to 65% solids can be pumped, and particles from ½ inch diameter to 1 inch diameter will pass safely through the runner.

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Montana *(Continued)*

lease a few months ago. C. F. Buls, Missoula, is president of the Mineral King Mining Co.

• **Churn drilling** for manganese and other ores has been resumed on the Garibaldi claim in the western part of the Butte district, Silver Bow County. The property is held under lease by I. G. Irving and Robert H. Nelson, consulting mining geologists, Hirbour Building, Butte, who also operate the nearby Norwich and Plutus mines, which now are producing substantial quantities of pink manganese (rhodochrosite) ore and employ about 20 men.

NEVADA

• **Pioche Manganese Co's** electric furnace at its Henderson plant is now in operation, after two years of construction. It made possible the first production of ferromanganese in the Henderson area. The furnace is a 7500-KVA type and the feed is automatically combined with flux and reducing agents to make proper charge for the production of metal. The tapped metal is cooled in trays and later broken to lump size for shipment. Richard W. Lottridge is smelter manager, F. B. Petermann is assistant plant manager, Frank P. Soulders is plant superintendent, and R. E. Kirk is master mechanic. A second furnace is nearing completion. When both furnaces are in full operation a crew of about 60 men will be employed. Pioche Manganese is an associate company of Combined Metals Reduction Co. E. H. Snyder is president, and M. J. Kennard is general manager. Both men maintain offices in Salt Lake City.

• **Due to the decline** of the price of zinc, operations have virtually halted at the Caselton Mine in Lincoln County, one of the state's largest zinc producing operations. Combined Metals Reduction Co., owner and operator of the property, posted notice late in Sept. laying off 75 men employed at the Caselton. It was the second large lay-off during recent weeks. Work will continue in mining lead-silver ores and on milling the large accumulations of managese ore stockpiled.

To provide work for men laid off at its Caselton mine, Combined Metals Corp. has added a second shift at its Black Metal and Hurley manganese operations in Lincoln County. Company officials also announced that production crews will be added to the operations at the Minerva tungsten mine 70 mi. northwest of Pioche as soon as work is completed on surface and camp facilities.

• **Expansion program** to cost an estimated $2-million is under way at the Blue Diamond gypsum plant in Clark County. Mining and processing of nonmetallic rocks is proceeding at the

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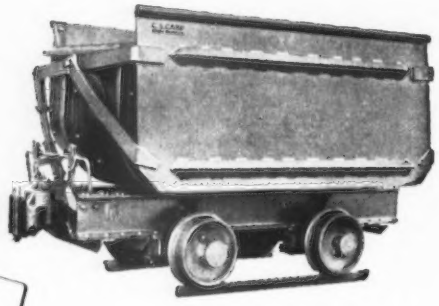

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Nevada *(Continued)*

rate of 900 tons daily and will be stepped up to 1,200 tons when the new developments are completed.

• **U. S. Lime Products Corp.** is mining 1,000 tons of limestone rock daily at its property near Henderson, and 300 tons of finished lime are being shipped out each 24 hours.

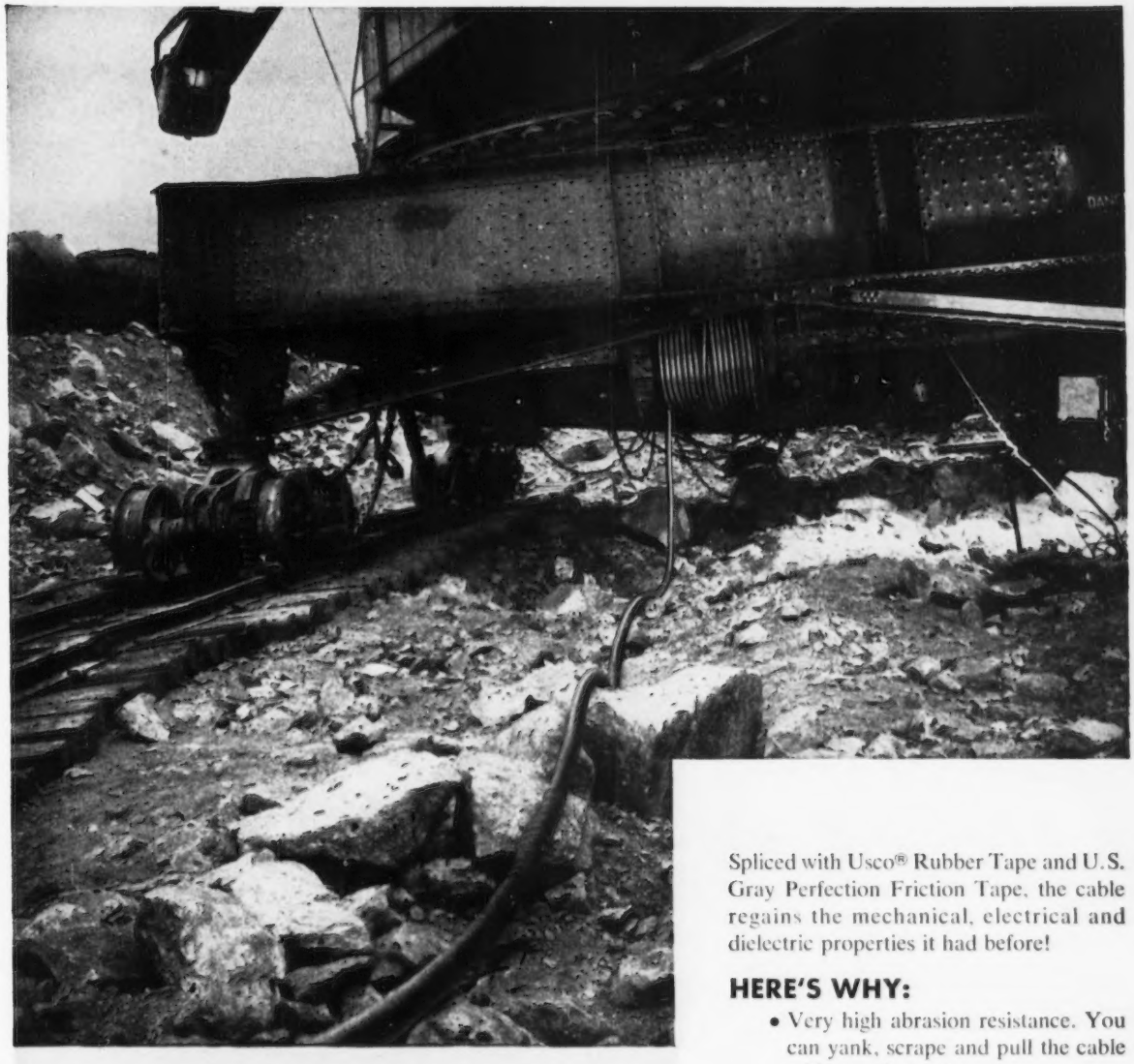
• **Western Electrochemical Co.** at Henderson has started rebuilding the portion of its plant which was destroyed by fire early in Sept., and the work is well along toward completion. The blaze did an estimated $50,000 damage, according to company officials. It is believed that calcine on the conveyor belt started the fire, and the large structure where it began was entirely gutted before the blaze was under control. A portion of the manganese dioxide plant was housed in the same building.

• **Uranium Metals Inc.**, a Denver concern, has resumed the search for uranium in the Kings River area of Humboldt County 75 mi. north of Winnemucca. Development is being carried out on a number of claims established several months ago by Jess Naciando, Irving Sweeney and James Murdock. Considerable work was carried out on the property by Robert Spitzer and Associates before Uranium Metals Inc. assumed control. Heavy equipment, timbers and other materials have been moved to the site. Roy F. Roseberry of Elko is superintendent in charge of operations.

• **Midnight Tungsten Mines Inc.** have taken under optional purchase the tungsten property owned by Mark Harris of Fallon and Fred T. Pine and William W. Brown of Las Vegas. The property lies six mi. west of the Kaiser fluorspar mine in Churchill County. D. C. Wray is general manager for the Midnight Co., and Arthur Lakes, of Spokane, Wash., who is consultant geologist, has completed his report on the property and laid out a work program. Exploration work is being carried out and heavy equipment has been moved onto the site.

• **Otto Kohl**, general manager of the Chick Bed diatomaceous earth property and processing plant at Fernley, has announced that installation of equipment to control dust at the plant has proved successful. Cost of the installation was more than $10,000. The Chick Bed property, 22 mi. northeast of Fernley, contains one of the largest single deposits of diatomaceous earth on the North American continent, according to company officials. It covers more than 4,000 acres and is 400 ft. deep. The Fernley plant employs 22.

• **Production of titanium** by Titanium Metals Corp. which operates a unit in the former Basic Magnesium plant at Henderson, is expected to reach 10 tons a day before the end of the year, according to company officials. The plant was started in 1951 and at that time was producing only one ton daily. Improvement in the process has stepped up the production rate steadily.



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At Mary Ellen Mine—heavy media plant in building at left; conveyor on right delivers ore from crushing plant in pit *(see picture below)* where Telsmith Gyraspheres do fine crushing.

crushing

BANDED TACONITE with

TELSMITH Gyraspheres

ON THE MESABI IRON RANGE

● On the Mesabi Iron Range of Minnesota, the Stanley Mining Co., Biwabik, Minn., is mining and treating banded taconite. Here their Mary Ellen Mine has two Telsmith Gyraspheres (shown at the right) which have, for the past two years, been doing a right good job of fine crushing for the mill feed. Plus 2-in. material passes to one No. 48 Telsmith Gyrasphere, with coarse crushing concave bowl, set at 1-in., and in closed circuit with a screen. Minus 2-in. plus ¾-in. oversize from the screen's bottom deck passes to a second No. 48 Telsmith fine concave Gyrasphere, set at ⅝-in., and thence to the beneficiation plant.

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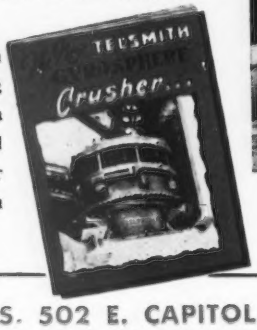

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NEW MEXICO

• **Six New Mexico leaders** of the International Union of Mine, Mill & Smelter Workers face jail sentences as the result of a ruling of the state Supreme Court in Santa Fe. But one more ruling must be made which could possibly stay the 90-day terms.

Issues before the court are an aftermath of the violent, year-long strike by the union's Local 890 against Empire Zinc Division of the New Jersey Zinc Co. at Hanover in Grant County. During the strike, the company obtained temporary and then permanent injunctions against pickets interfering with traffic on the main road to the mine.

The Supreme Court set bond of $1,000 per man or $5,000 for the group pending its final determination.

• **United States Smelting, Refining & Mining Co.** announced suspension of all mining and milling operations by it Bayard Division, effective Sept. 30. The shutdown closed the last major lead-zinc producer in the Silver City mining district.

Announcement was made by J. T. Lewis, Jr., general manager. Some 200 miners were thrown out of work.

Shutdown left only one major operation going in the area, Luck Mining Construction Co.'s Boston Hill mine, state's principal producer of manganese. Another major concern, Kennecott Copper Corp.'s Chino Mines Division, was strikebound early in October, though there were hopes for early settlement.

With Kennecott back in production, the Silver City area will have nearly 2,500 men at work in the mines with an estimated monthly payroll of about $1.2-million. Before this year's cutbacks, employment in area's metal mines ran about 3,500 men drawing some $1.8-million monthly.

It is reported that more than half the miners idled by shutdowns of Empire Zinc, Peru Mining Co., and American Smelting & Refining Co. properties have found employment in Arizona and Montana copper mines.

OREGON

• **Hanna interests** at Nickel Mountain project in southwest Oregon are moving ahead at a rapid pace with construction.

Tramway support foundations were poured in Aug. to start erection of a bucket line from the benching sites atop the mountain to the smelting facility location on the valley floor. Foundations for the furnace plant were poured in Sept. Water service has been coupled in and rail spurs completed since mid-summer, as well as expansion of office facilities at the site near Riddle.

Hanna Coal and Ore Corp. is expected to make a $4.3-million investment and Hanna Nickel Smelting Co. to utilize $24.8-million DMPA advance

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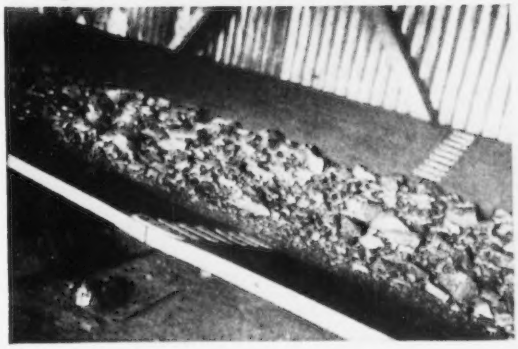

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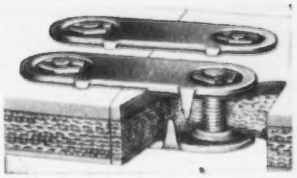

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Oregon *(Continued)*

on financing of the smeltering plant and related facilities. It's the largest mining industry development in Oregon since the early pioneer eras when gold dominated the mining economy of the region.

• **Abandonment of 126 mining claims** on Federal lands in Oregon was reported by the Bureau of Land Management as a result of mailed queries to about 400 persons holding 890 claims on Ore.-Cal. revested tracts under the bureau's administration. Region BLM chief William G. Guernsey said the letters notified holders that they had failed to file notice of 1953 assessment work. This query was made in order to help clear the record of non-active claims and save unnecessary field investigations by the bureau's inspectors.

• **A five ton mill** to test a free milling ore showing at the Sanger Mine east of Baker in Oregon's Baker County is being built by William Wendt, Baker. The mine is one of the famous early day producers in eastern Ore. The vein to be tested was discovered several years ago and has been under development for the past two summers. A length in excess of 300 ft. along the vein has been indicated.

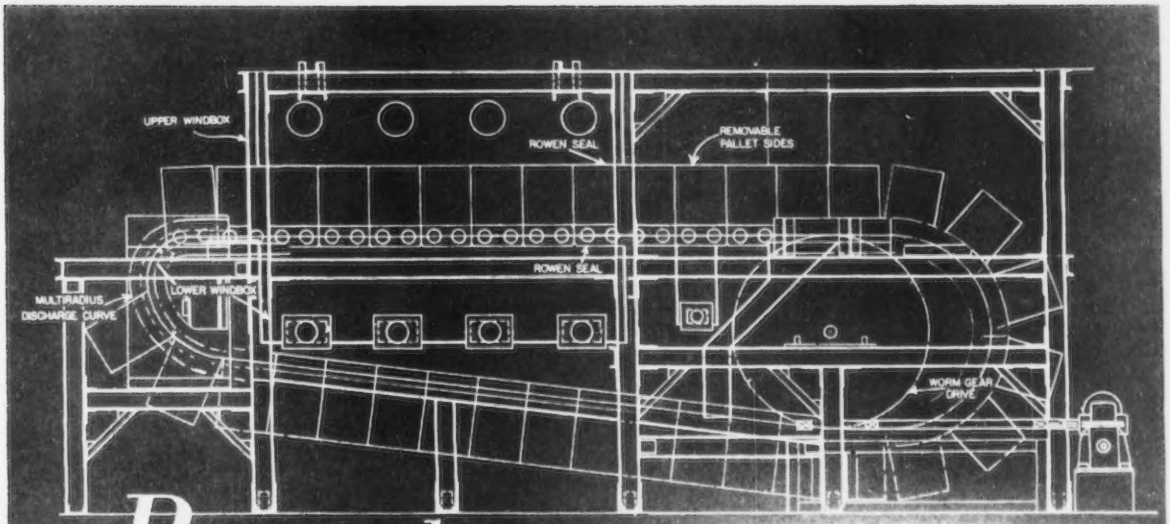
• **Queen of Bronze Mining & Smelting Co., of Grants Pass,** has sent an initial shipment of about 1,000 tons of copper concentrate to the Tokyo Boeki Shokai, a Japanese trading company, for use in Japanese smelters. The company has agreed to send between 19,000 and 28,000 tons during a one year period.

• **Transcontinental Resources** is reported to have taken an option on the property of Alameda Mines, 15 mi. west of Grants Pass. Unwatering has been completed to the 350-ft. level. Plans are for checking the possibility of blocking out a tonnage of high grade ore. According to Transcontinental officials, a diamond drill test from the 150-ft. level has intersected a 5.6-ft. vein said to average 1.34 oz. of gold per ton. Copper was the principal mineral taken from the mine in the early 1900's with some gold and silver.

TENNESSEE

• **Crane Co.** has started construction of its new $25-million titanium plant at Chattanooga. V. P. Rumley, senior vice-president of manufacturing, told civic and business leaders gathered at the ground-breaking ceremonies that the Chattanooga area would be the titanium center of the world (*E&MJ*, September, 1953, Page 136).

• **New Jersey Zinc Co.** has begun sinking a shaft on its property one mile south of Jefferson City (*E&MJ*, August, 1953, Page 148). This initial shaft, to be sunk 1,200 ft., is to be completed next year.



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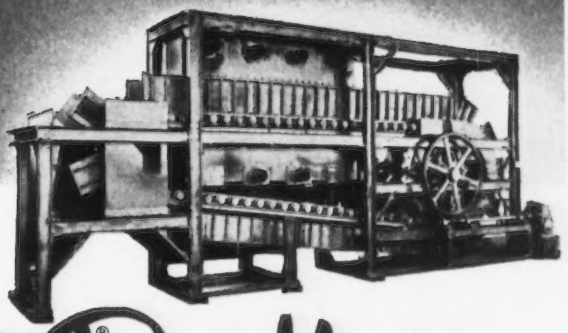

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The new Dwight-Lloyd Pilot sintering machine provides features in its design to enable research personnel to experiment with the many techniques now under investigation. The unit can be operated by down draft or up draft, or in combination. Gases may be recirculated for full heat recuperation or gas enrichment. Upper and lower windboxes can be compartmentized to give any recirculation setup. Pallet sides are removable and can be furnished in varying heights to enable investigations involving various bed depths.

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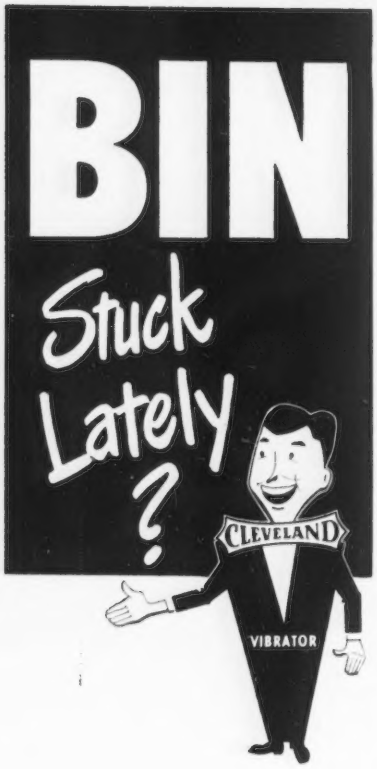

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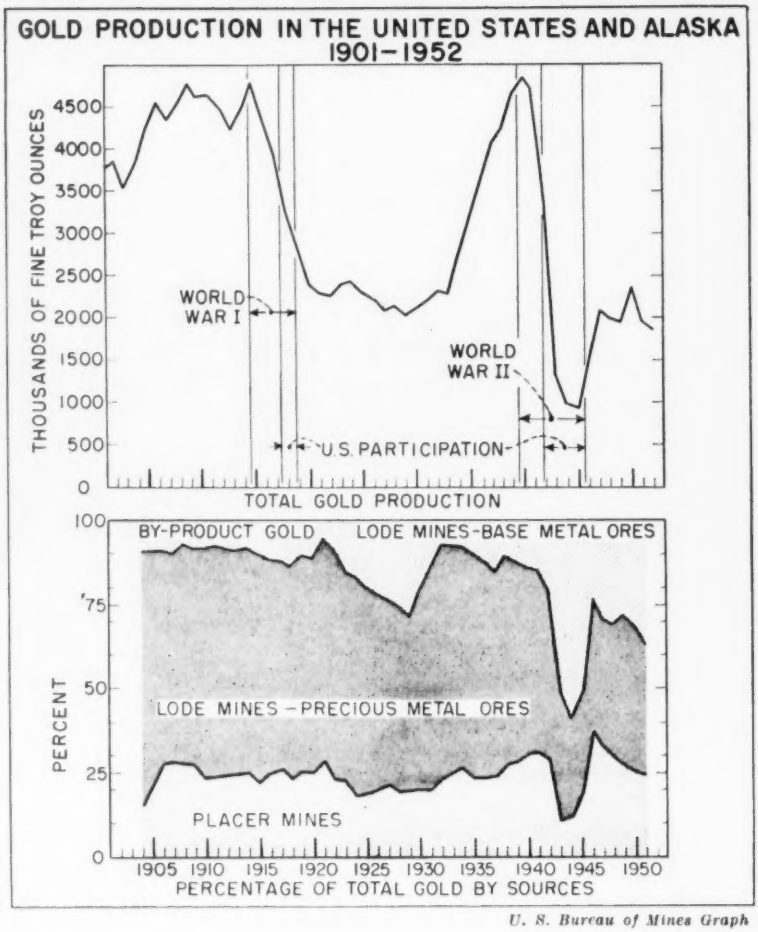

U. S. Bureau of Mines Graph

UTAH

• **Employment of Dorr & Co.**, engineering firm of Stamford, Conn., as technical consultants for construction of the uranium mill at Moab has been announced by Charles A. Steen, chief geologist for Utex Exploration Co.

The Utex firm, with operating mines near Moab, reported among the most productive uranium properties in the nation, expects construction of the planned $3-million mill will begin in early 1954.

WASHINGTON

• **A northeastern Washington mine** idle since World War I, the old Lone Star Mine near Curlew in Ferry County, will be worked again in a copper exploration program by Attwood Copper Mines Ltd., Vancouver, B. C.

The Lone Star Mine, abutting the Canadian border, is in the southern extension of the Boundary District, site of the famed Phoenix and Greenwood copper camps, of years ago. For the past two years, the Attwood company has undertaken detailed geological exploration and drilling at several old producers in the district.

The Attwood company's general manager is D. F. (Cap) Kidd, a past president of the Canadian Institute of Mining & Metallurgy. This week he signed a contract with the DMEA (at the Spokane field office) to lend the firm half of $109,196 it plans to spend developing the Lone Star Mine by diamond drilling and a new lower adit.

• **Jim Creek Mines, Inc.**, Spokane, reports steady progress in lead and zinc exploration under a $47,500 contract with the Defense Minerals Exploration Administration. The work is located about 10 mi. northwest of Ione, Wash., in the Metaline District. Frank H. Mitchell, Spokane, is consulting engineer in charge.

• **Kaniksu Metals Inc.**, Colville, Wash., has purchased several groups of mining claims in northern Pend Oreille County. Incorporators of the newly formed Kaniksu company are E. J. Cowan and M. F. Flannigan, Tacoma, and Norman D. Lindsley, Colville mining engineer.

Lindsley says the company has taken over the Rocky Creek, Bearpaw, Widger and Snowshoe properties. The holdings were obtained through Grandview Mines, Spokane. Kaniksu,

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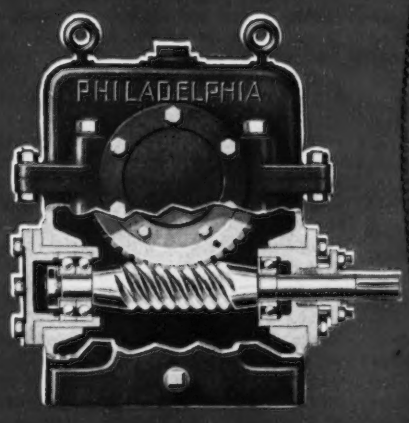

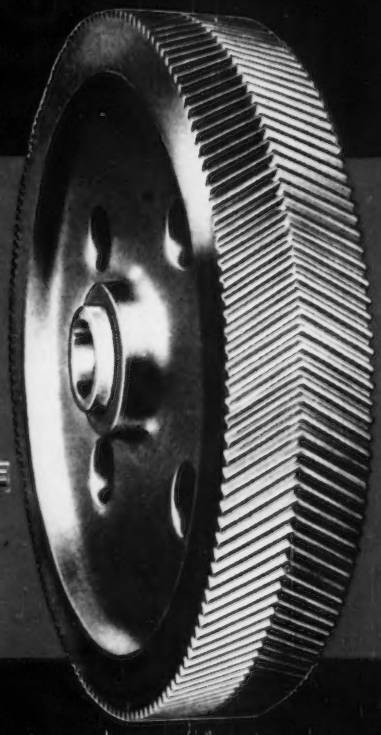

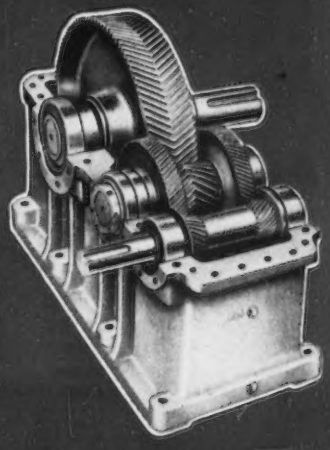

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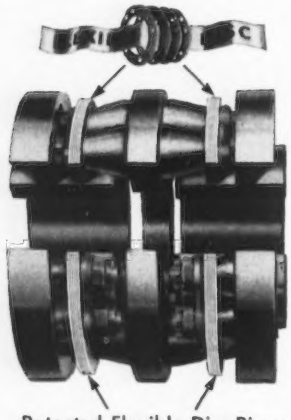

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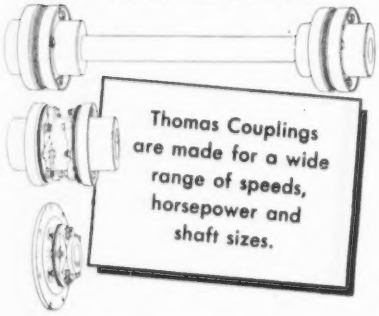

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Washington *(Continued)*

with registered offices in Tacoma, plans development work at one property this fall.

• **First major Metaline district mine** to cut back following new wage agreements and slipping lead-zinc prices is the Grandview Mine of American Zinc, Lead & Smelting Co.

John Currie, general superintendent of operations, said the mine has begun a 5-day week with one production shift daily. Like most other mines in the northwest, Grandview had been operating six days a week with two shifts.

• **Ruby Silver Mines Inc.** has filed articles of incorporation at Olympia, listing capital at $100,000. H. D. Khont, A. G. Henderson and F. J. Rosenstein, all of Yakima, are the incorporators.

• **Pacific Northwest Alloys Inc.'s** plant t Mead, may produce ferromanganese, according to H. B. Megill, executive vice-president and general manager. Chromium Mining & Smelting Corp., of which the Pacific company is a subsidiary, plans to produce ferromanganese and the Mead plant will probably handle some of it if power is available.

• **Border Lord Mining Corp.** reported it expected to start milling ore in Oct. at its tungsten property in the Cascades of Chelan County, just a mile south of the Canadian border. Supplies have been packed or parachuted into the camp, which is at an 8,000-ft. elevation. The ore is wolframite and scheelite.

• **Two DMEA loans** totaling $28,700 to help finance lead-zinc exploration at Grandview Mines' properties have been granted, according to A. E. Weissenborn, executive officer at the Administration's Spokane office. Weissenborn said the applications had been made before the May 15 deadline for such loans. An equal amount will be provided by the company. Drilling on property in the Currant Creek area calls for expenditure of $36,400. Diamond drilling at the Hartbauer property near Deep Lake calls for $21,000. The latter property adjoins the Goldfield Consolidated Mines Co.'s Anderson open-pit mine.

• **A $10,200 tungsten exploration project** at Big Q Tungsten Mine Inc.'s Stevens County property has been approved by DMEA which will loan the company $7,650 to be repaid from production. The company is developing the old Deer Lake tungsten property, 10 mi. north of Deer Park. The program, which consists of 300 ft. of drifting, crosscutting and raising, and 200 ft. of timbering, is to be completed in six months according to William M. Quigley, Seattle, president of Big Q. The work will determine limits of an ore shoot on the No. 3 level, seek the shoot's downward extension, and explore a mineralized portion on the No. 2 shaft level. The 25-ton mill is being repaired. Plans call for a crew of about 12.

IN CANADA

MANITOBA

• **Sherritt Gordon Mines** expected to be operating a part of its nickel-copper concentrator at Lynn Lake by the beginning of Nov. Concentrates will be stored pending completion of the railway to Lynn and the treatment plant at Fort Saskatchewan. Railway service was expected to be in operation by mid-Oct. and the treatment plant at Fort Saskatchewan by mid-Jan. The pilot plant at Ottawa is now being turned over to test work on copper concentrates using the forward leaching process. If economical, it is proposed to treat the Lynn Lake copper concentrates at Fort Saskatchewan rather than ship to a customs smelter.

QUEBEC

• **Latest addition** to Quebec's list of base metal producers is United Montauban Mines, new company formed earlier this year as a merger of Montauban Mines and United Lead & Zinc Mines with property adjoining the Anacon mine in Portneuf Co., some 40 mi. west of Quebec City.

The 500-ton mill, already operating at capacity, is fortified by ore reserves estimated at 900,000 tons grading slightly better than 1% lead and 3% zinc plus modest values in silver and gold. Feature of operations under the direction of T. C. Hewitt, mine manager, has been the low operating cost of $3.64 per ton achieved during the first few weeks of production.

• **The Province** is about to lengthen its list of copper producers, too. Quebec Copper Corp. is making good headway in construction of its 500-ton mill in Brome Co., 70 mi. southeast of Montreal in the Eastern Townships, and is expected to join production ranks early in 1953. Minimum ore reserves are calculated at 500,000 tons averaging 2% copper, all below the old workings (originally opened in Civil War days) but above the 1,000-ft. level. The estimate can be increased substantially in tonnage by adding lower grade sections.

Company is financed and controlled by East Sullivan Mines and Sullivan Consolidated Mines, and the property is being brought to production by the aid of a $1-million 6% mortgage loan repayable five years after the start of milling.

• **Shaft deepening** has been completed by East Malartic Mines, veteran gold producer of the Malartic area, and lateral work is being started on the three new levels for the establishment of which the project was undertaken. About 600 ft. of crosscutting will be required to reach the ore zone on each of the levels, but news of work-in-ore should start appearing around year-end.

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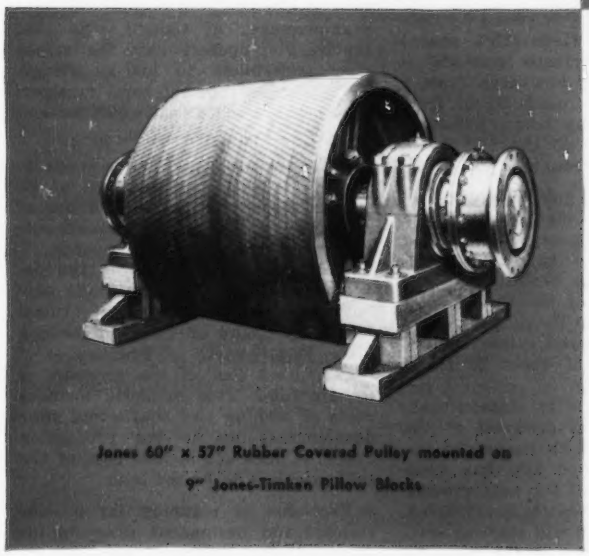

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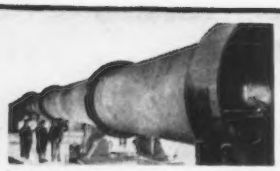

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Quebec *(Continued)*

• **Consolidated Candego Mines,** small but high grade lead-zinc producer near Marsoui on the north shore of the Gaspé Peninsula, has increased daily tonnage from 50 to 70 tons and is thereby managing to keep its results in black ink in spite of low metal prices. Development work is being kept to a minimum, but results continue to be satisfactory, an official states.

• **Cleveland-Cliffs Iron Co.** and M. J. O'Brien Ltd., operating independently, have quietly acquired extensive holdings in the Chibougamau District, *The Northern Miner* reports.

The holdings are said to be in the Mistassini-Albanel Lakes Section, some 100 mi. northeast of the new mining townsite of Chibougamau. Each company reportedly has staked about 60 sq. mi. of ground, some 1,000 claims apiece, to cover a broad belt of iron formation.

• **Consolidated Zinc Corp. of Canada,** subsidiary of Consolidated Zinc Corp., Ltd., of London, has acquired an interest in New Insco Mines Ltd. and will begin exploration immediately at Lake Dufault in the Noranda District.

ONTARIO

• **Possibility that Ontario** may add a copper-zinc producer to its mining list is seen in results of initial exploration of a property in the Heron Bay-White River area. The first four holes drilled suggest 2,000 tons per vertical ft. averaging 1.45% copper and 11.3% zinc plus several ozs. of silver; best hole showed a true width of 53 ft. averaging 3.04% copper, 8.99% zinc, and 7.48 ozs. silver. Intersections consist of massive sulphides replacing a silicified diorite, with assays in even the high grade sections reported remarkably uniform.

The new showing is owned by Consolidated Howey Mines (25% share) and a group of private interests. It is in a completely new area from a mining standpoint, and is 25 mi. from the nearest railway point, Hillsport, on the main line of the C.N.R., in rugged lumbering country.

• **There's a new gold discovery** to report this month, too; first one in a long time, gold prospecting having waned toward the vanishing point. It likewise is in a brand new area, 25 mi. southwest of the Pickle Crow gold mine in the Patricia District. Initial reports showed values of $25-30 across widths of about 30 ft. in surface prospecting.

The find is owned by Hasaga Gold Mines, former gold producer of the Red Lake area, which suspended operations a year ago and has since been on the lookout for new ground. Winter camps are being constructed, and surface drilling will start as soon as men and machines can be taken in. The company is well supplied with funds, having somewhat more than $300,000 in net current assets as well as its milling plant, which has been kept intact, it was reported.

• **Start of milling** at the property of East Rim Nickel Mines, junior nickel-copper operation on the east flank of the Sudbury Basin was expected at the end of October. The plant will have a rated capacity of 500 tons daily, but crushing and grinding plant has been designed for double that tonnage.

• **There's shaft-sinking news** in silver, too. Cotley Mines, controlled by McWatters Gold Mines and associated interests, is going underground to develop a small but high grade silver orebody outlined by drilling at its property in Mickle Twp., in Gowganda's Elk Lake section.

• **God's Lake Gold Mines** is carrying out an extensive electro-magnetic survey of its nickel-copper property adjoining Sherritt Gordon's Lynn Lake development. Several anomalies warrant detailed exploration and a diamond drilling campaign is expected to be carried out after freeze-up. The company has acquired a base metal prospect in New Brunswick and also a group of claims in the Blind River uranium area of Ontario.

• **San Antonio Gold Mines** reports it has acquired two groups of claims in the Blind River area of Ontario. Surface work is being carried out on one group near Rawhide Lake where good radio-activity is indicated by scintillometer readings.

• **Inland Steel Co.** has awarded a contract to Construction Aggregates Corp. of Chicago for dredging in connection with development of Inland's iron ore mine in Steep Rock Lake.

Contract was let by Caland Ore Co. Ltd., Inland's Canadian subsidiary which was formed to develop and operate the Steep Rock property.

A. J. Cayia, vice president and general manager of Caland, said that the dredging operation was the largest ever undertaken to his knowledge. He estimated that the total consideration under the contract would amount to more than $25-million.

• **Falconbridge Nickel Mines** is readying the largest single project of its expansion program which is aimed at eventually doubling annual nickel output from 30- to 60-million pounds.

This mammoth project is the development of the Fecunis Lake orebody, which adjoins International Nickel Company of Canada's Levack Mine, 20-mi. north of Sudbury.

Estimated cost of the program is $11.5-million. This estimate includes costs of sinking two shafts and mine development up to the production stage. It does not include cost of the mill, which is to be set later.

• **Frobisher** is planning for a substantial and permanent graphite industry, it has been reported.

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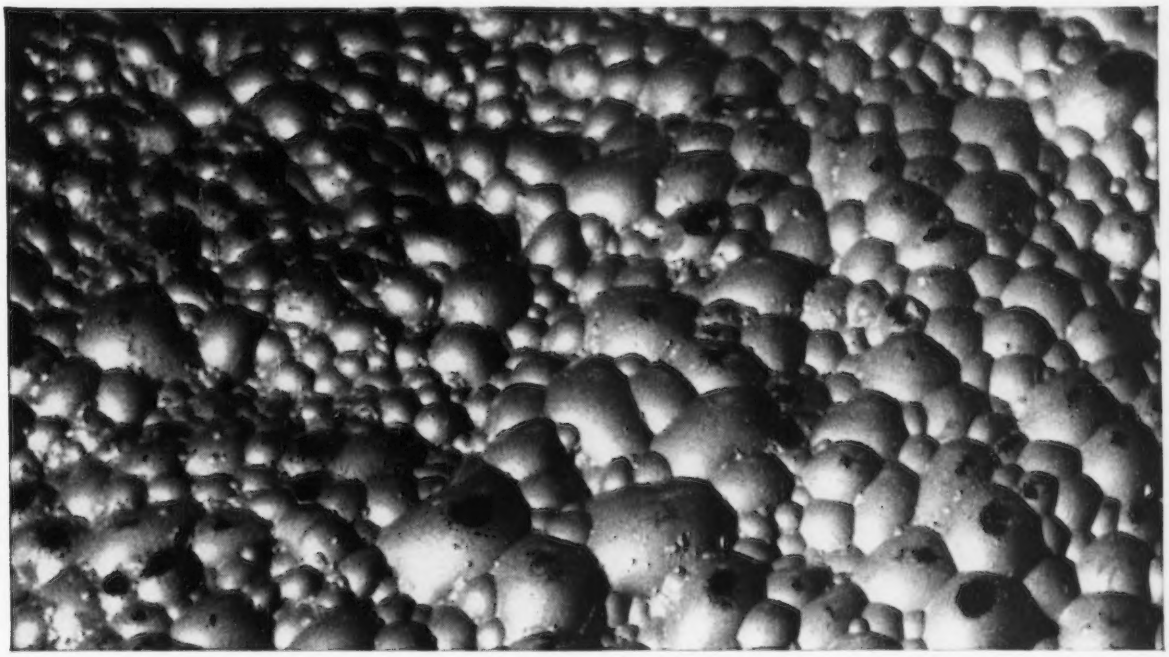

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NEW BRUNSWICK

• Way has been cleared for production planning by Brunswick Mining & Smelting Co., approval having been given by all concerned to that company's absorption of the Leadridge (St. Joseph Lead Co.) and Anacon-Leadridge properties, including the big orebody outlined by drilling on the latter ground.

St. Joe is to loan Brunswick up to $7.5-million and provision is made for further loans of $17.5-million if needed. The operation is one of the biggest planned in Canada for many years. Ore treatment sights will be set high, perhaps up to 10,000 tons daily, with smelter facilities or their equivalent included. Products will be lead, zinc, silver, copper, and possibly tin, as well as plants to take advantage of the ore's high suphur content.

BRITISH COLUMBIA

• **A tungsten development** 20 mi. southwest of Penticton in the Okanagan area of B. C. has been carried out by Alocin mining syndicate of Penticton, which reports U. S. interests have optioned the prospect on Readon mountain north of Keremeos. Preliminary examinations show a deposit 2000 ft. long, 600 ft. in width and estimated depth of 100 ft. Ore is reported to be high grade.

• **Western Tungsten Copper Mines Ltd.** reports milling at its Red Rose tungsten operation at Skeena Crossing hit a new high of 175 tons daily on Sept. 1 and that output for the three months ended July 31 was valued at $525,370, with mill averaging 127 tons daily.

• **Roaster and acid plant units at** Cominco's new Kimberley fertilizer department have gone into operation, following production start of the phosphate rock crushing plant. The new project was scheduled to start output of fertilizer by Oct.

• **Granduc Mines Ltd.** has been formed to develop the Granduc copper properties northwest of Stewart. Granby Consolidated Mining, Smelting & Power Co. Ltd. carried out diamond drilling this season and reports two prospective copper ore-bodies with possible extensions indicated.

SASKATCHEWAN

• **Beta Gamma Mines Ltd.** is proceeding concurrently with surface exploration, diamond drilling and shaft sinking, with favorable results, at its Beaverlodge Lake area properties. Drilling on the White Dog group of nine claims on Moose Island and the adjacent mainland uncovered a major occurrence which has been traced for 500 ft. with good widths in places. Directors recently authorized Mine Manager K. S. Oliver to proceed with the shaft sinking immediately to take advantage of good weather.

ALBERTA

• **Two diamond drills** and a company field crew of five men are now working on the recently acquired 16-claim property of Goldfields Uranium Mines Ltd. at Ray Lake, some 100 mi. southwest of Beaverlodge on the northern transportation navigation route.

NOVA SCOTIA

• **Anacon Lead Mines** reportedly has bought, subject to a participating seller interest, a new tungsten discovery. The discovery, protected by a 6 sq. mi. concession, is on the Strait of Canso in Guysborough County. Seller of the property was listed as G. P. McKay.

NORTHWEST TERRITORIES

• **In initial exploration** of Hottah Lake Uraniums Ltd. properties, preliminary samples from open trenches have returned values which radiometric surveys indicate are up to $300 per ton over good widths. The company, formed in April by Vancouver and Victoria, B. C., businessmen, owns two groups of 18 claims each near Hottah Lake, about 225 mi. north of Yellowknife.

IN LATIN AMERICA

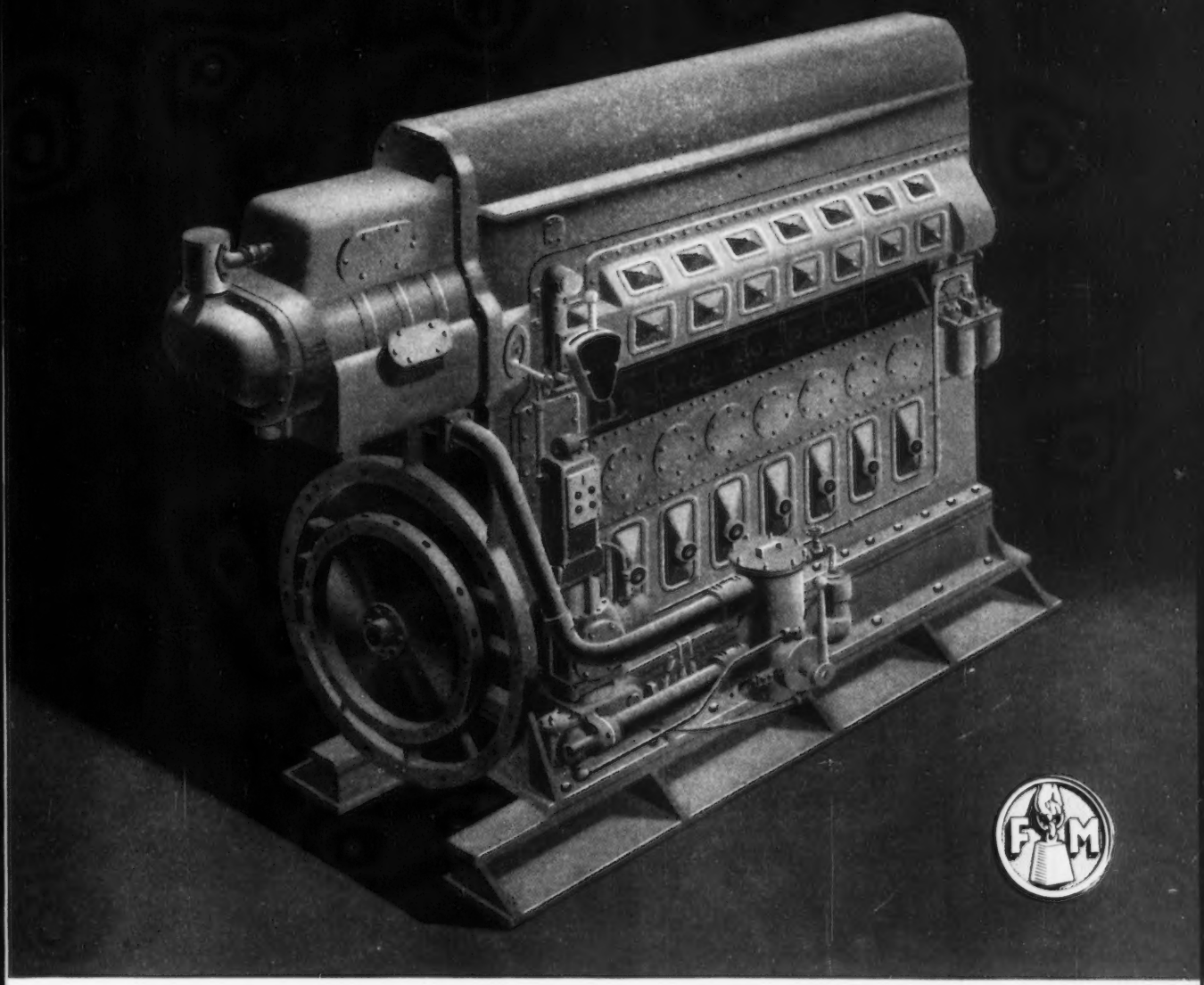
ARGENTINA

• **Sominar modernization** and expansion plans for greater tungsten production are well advanced. Machinery already is arriving from the United States and the new 500-ton concentrator for Los Condores mine is expected to be in operation in January.

Smaller plants will be installed at Los Avestruces, Bismutina, La Aspereza and San Ignacio mines, giving an overall capacity of some 700 tons per day. By then, Sominar will be one of the largest tungsten producers in Latin America with about 2,000 tons of concentrates yearly.

• **Direccion Nacional de Mineria** has resumed exploration of Agua Tapada, important gold and manganese deposit of Catamarca. At the same time, testing of ore is underway with a view of installing a pilot plant.

• **Alunite deposit,** with estimated re-



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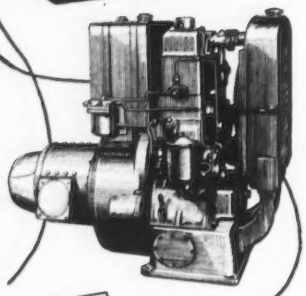

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Argentina *(Continued)*

serves of 26-million tons of ore, has been discovered in Patagonia, near Puerto Camarones.

BOLIVIA

● **Bolivian Mining Corp.** has signed a contract for the sale of minerals and tin concentrates to the American Reconstruction Finance Corp., it was announced in La Paz.

Under the contract, 10,000 tons will be delivered at Pacific Coast ports by March 31, 1954, at prices ruling on the New York markets at that time.

● **A gold mining center** near Tipuani, at La Paz Province (Unutuluni, 2,800 inhabitants) was destroyed recently by fire. Every one of the Unutuluni homes had dynamite deposits; one of these during the night caught fire.

BRAZIL

● **Exportation of manganese** having a higher content of ore than 44% will be prohibited from the Lafaiete, Burnier, Saude and Itabirito mines in the state of Mines Gerais, under a draft bill which has been approved by the Committee on Economy of the Federal Chamber of Deputies.

The Committee also approved an amendment which calls for a reduction in the exportation of such ore by 10% per year, based on the volume exported in 1953, as from next year.

● **Studies made** indicate around 120 manganese deposits in Minas Gerais, with an estimated 8-milion tons of manganese ore having a metallic content of over 42%, according to the Minister of Agriculture.

Total reserves in that State were calculated at between 12- and 15-million tons, as follows:

Lafaiete area	1,500,000 tons
Saude area	3,000,000 tons
Burnier area	1,000,000 tons
Others	500,000 tons

CHILE

● **Though there has been** much talk on what the government policy will be on the question of the sale of the accumulated stock of copper at Chilean ports since the Central Bank's chief council returned from Washington to Santiago to receive instructions, the only authenticated information with respect to what will be done with that copper and to the policy that will be followed in general with regard to copper, was that given officially after a Cabinet meeting which took place Sept. 4 and which resumes the government's policy with regard to copper as follows:

a) To carry on discussions with the United States government, but at the same time to instruct the Central Bank to consider serious and responsible offers that it may receive;

b) To instruct the Central Bank in order that, under the same conditions, it should give preference to those dealings with old and well established markets;

c) To consider and take a decision on this problem from a national point of view leaving aside every other consideration.

Meanwhile, The Secretary of the Treasury announced that the U. S. Government is willing to buy 100,000 tons of Chilean copper but the question of price was being discussed in Washington.

He considers this as the first stage in the solution of the whole problem and that the second stage will be dealt with between the Chilean Government and the U. S. companies operating in the country.

One of the most important points to be settled in these conferences will be the question of the exchange rate which is only 19.37 pesos to the dollar for these corporations while the official rate is 110, according to reports.

● **Andes Copper Mining Co.** has continued drilling copper deposits of Indio Muerto 25 mi. north of Potrerillos near the Pedernales saltpan.

● **Much interest** continues to be shown by large U. S., German and Japanese companies on the high grade iron deposits of Chile which occur along a narrow belt near the coast in the provinces of Coquimbo and Atacama from about the latitude of Ovalle to Chañaral. However, to increase present production, not only will the mines have to be properly opened up and mechanized but embarkation facilities will have to be considerably improved at the ports of Coquimbo, Huasco, Caldera and Chañaral.

CUBA

● **The government's** Agricultural and Development Bank (BANFAIC), through its industrial section, has loaned $250,000 to the Compania Industrial Minera Los Cerros, S.A. for development of the copper and zinc properties of the Los Cerros mine, in Fomento, Las Villas province, where a concentrating plant is to be built.

Up to $200,000 is to be used in the purchase and installation of a plant with a daily capacity of 60 tons, and the remainder as operating capital.

Compania Industrial Minera Los Cerros, S.A. is made up of more than 200 shareholders. Its aim is to establish small concentrating plants where mineral deposits are located to avoid shipping crude ore abroad. It plans to exploit mine holdings which hitherto have been failures because of the inability of small companies to remain in business because of heavy exploration costs.

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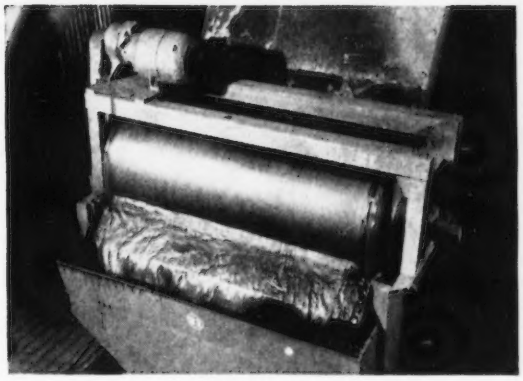

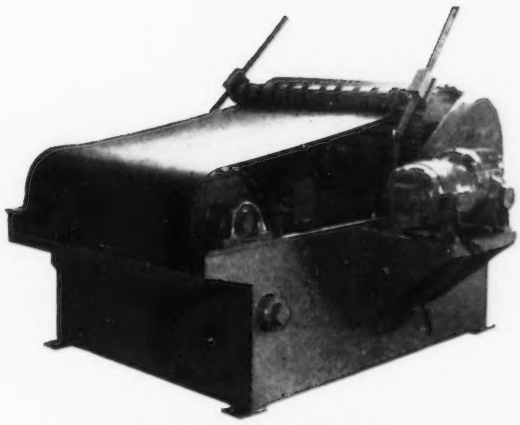

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JAMAICA

● **Kaiser Bauxite Co.** in Oct. has temporarily suspended shipments of Jamaican bauxite to Baton Rouge, La., it was announced in Kingston. A major reconstruction and installation program is now being carried out at the Baton Rouge plant and until this has been completed, no further large bauxite supplies are required, the announcement said (for map of area, see page 132). The period of suspension was not announced but was understood to be likely to continue until the middle of November, it was reported.

MEXICO

● **The Mexican mining industry situation** is bad and is growing worse, say the Mining Chamber and the National Federation of Medium and Small Scale Miners. Complete and drastic revision of fiscal mining legislation in its work and export divisions is imperative to avoid the industry's early collapse, the Chamber warns. Mining is still Mexico's top industry, and last year yielded 2,785-million pesos ($320-million). Lower prices for many of mining's exportable products is a stiff body blow.

● **Stanley E. Shamosh,** wealthy American miningman in Mexico, his son, Edward, Frank Lowenstein, their associate, and their wives, were held up and robbed of 80,000 pesos ($9,250) in cash and valuables by bandits who ambushed their jeep near Paso de Arenas, Guerrero, as they were inspecting the Pinzon gold-silver mine, with a view to purchase. No one was injured. Two of the six robbers have been captured; but none of the loot recovered.

VENEZUELA

● **Carlos D. Pietri,** manager of the Venezuela Sulphur Corp., said the company expects to produce 250,000 tons of sulphur annually when it starts production next year.

Pietri just has returned from the United States where he inspected machinery for the sulphur refinery which will be shipped here in Jan. to be mounted near Carúpano in eastern Venezuela. He said the machinery cost Bs. 15,000,000 and will take six months to install.

Venezuelan Sulphur is headed by Benjamin S. Dowd of New York who is associated with John M. MacDonald, president of Loftus Engineering Corp. of Pittsburgh, Pa., and Dante Borgi, president of Neptune Meter Corp. of New York in the mining and refining of Venezuelan sulphur, which will come from the Costa Mora mines of El Pilar in the Benítez district of the state of Sucre.

PERU

● **A hydroelectric power plant** has just been placed in operation by Compania Minera Atacocha, outstanding lead-zinc producer in the Central Sierra. The plant is located at Chaprin in the LaQuinua Valley, about 25 mi. from Cerro de Pasco.

Two wheels generating 5,300 hp. have been installed and facilities are ready for installation which will boost capacity to 8,000 hp. The new power plant is to be used for Compania Minera Atacocha's new concentrator, which boasts a daily capacity of 500 tons of ore. New concentrator is only a few hundred feet from the old plant of 200 tons. The old plant also will be kept in operation.

Compania Minera Atacocha also has finished a tunnel below its lowest levels in order to transport ore directly by gravity from the mine to the tunnel and thence to the mill.

IN AFRICA

● **Mufulira Copper Mines'** development plan, costing more than £2-million, is being carried out at the 1,650 ft. level. When completed, the development scheme will boost production of the mine in Northern Rhodesia from 300,000 to 360,000 short tons per month.

Under the development program, hoist chambers, sheave-wheel rooms and motor-generator chambers are being mined out to house machinery which will serve three inclined shafts.

These shafts eventually will reach 3,650 ft. below the surface and will serve to exploit ores below the 1,650 ft. level.

● **American assistance** in exploiting valuable mineral resources at Mrima Hill, south of Mombasa, reportedly has been promised following talks in the U. S. by the Kenya member for Commerce and Industry, A. Hope-Jones. It has been agreed that the deposits of rich earths at Mrima are of sufficient interest to justify help from the Foreign Operations Administration, it was reported.

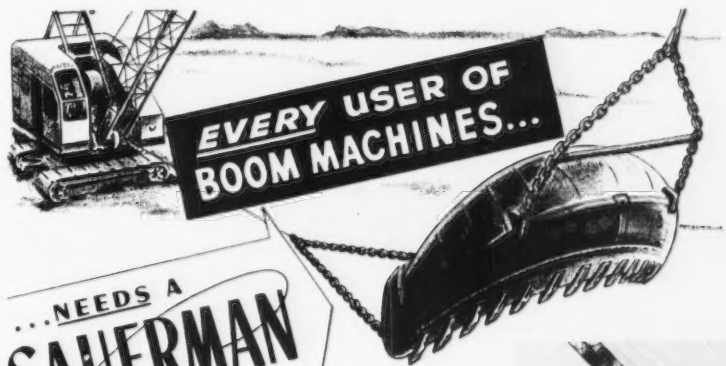
● **The Rhodesian Monteleo** asbestos mine is to be closed down and the property placed on a caretaking basis. The company was floated in Sept., 1951 and the plant became ready for operations in Dec., 1952. The directors announce that the adverse asbestos market conditions, which have progressively worsened in Southern Africa in recent months, have now brought prices to a level where it is uneconomic for the company to continue mining operations. The planned milling capacity was to be 180,000 tons a year and the deposit was expected support operations for a very long period of years.

● **O'Okiep Copper Co.**, operating in Namaqualand, has completed its exploratory drilling of the Nababeep West orebody and shaft-sinking is in progress. The company's new plant to treat ore from the tungsten orebody is functioning with a rated milling capacity of 200 tons a day.

● **Deposits of various minerals** have been located in a geological survey covering 1,750 square miles in southeastern Kenya, it is reported. The deposits include manganese, barium, lead, zinc, copper, and silver. Small quantities of coal were also found but, according to the survey, they have no economic value.

● **British Titan Products Ltd.** is backing a prospecting team which is searching for ilmenite in Gambia, according to the Gambia News Bulletin. Prospecting results so far have been sufficiently encouraging to warrant further expenditure on checking the extent of the reserve. The deposit occurs in beach sands near the village of Sanyang, and 100 tons of raw sand have already been shipped from Bathurst for large scale tests. It may be six months before any final decisions are taken, however.

● **The fabulous** State diamond diggings at Alexander Bay, near the mouth of the Orange River, are becoming poorer, says the South African Minister of Finance. They are on the "Oyster Bed" formations.



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Above, a 2½-cu. yd. Crescent scraper is used on a 1-cu. yd. boom dragline and the yardage rises to 270 cu. yd. per hour. The scraper is taking gravel from a roadside pit and delivering to a movable truck loader.

In this picture a Crescent scraper hangs from a trolley that rides on a slack cable extending from the tip of the boom to an anchorage across the river. Thus, it is able to excavate far beyond the reach of the boom and haul material onto the bank.

A Sauerman Crescent Scraper will repay its moderate-initial cost many times over when added to your boom machine as auxiliary equipment. Simple to rig up, it increases the machine's capacity when used on specific job operations mentioned below.

For backfilling, grading and other jobs where material must be moved but not lifted, the conventional casting method is used. The Crescent bites into and gathers the load with the ease of a plowshare, then hauls at ground level and deposits the load automatically when the forward pull is reversed. Machine strain and power consumption required to lift and swing the load to the discharge point are eliminated.

To dig material from a river, deep pit or soft area beyond the reach of the boom, another method is used to rig the Crescent Scraper to the boom machine. For such work the Crescent is suspended by chains from a simple trolley that rides on a track cable extending from the tip of the boom out to a movable anchorage. Digging, hauling and discharge proceed as in the casting operation. Following discharge, the empty scraper is lifted and gravity-returned to the excavaton point merely by tightening the track cable.

Any boom machine will handle a Crescent of larger size than its regular dragline and clamshell bucket. The Crescent is much lighter, size for size, than these buckets. Digging power and strength are derived from the Crescent's bottomless construction and flowing lines—not from weight of metal. Users of boom machines can obtain full information by writing for illustrated literature describing how other operators use Sauerman Crescent Scrapers on their machines to increase output and reduce costs.

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Africa *(Continued)*

● **There are now** 22 gold mines on the list of uranium producers. West Driefontein has received approval to go ahead with the erection of a recovery plant with a capacity sufficient to treat its own slimes residues, as well as those of the adjacent Doornfontein G. M. It is estimated that the plant will be in operation by the middle of 1955 and the contract is for 10 years from the date of full production. Capital expenditure in respect of both companies will be financed from U. S. and U. K. sources.

● **Newly-formed** Rhodesian Co. Sebungwe Mines & Exploration Co., has taken over operations on the copper deposit in the Hartly District of Southern Rhodesia. This has not been worked for 27 years, but has been explored recently by the Safari Exploration Co., registered in South Africa.

Both these companies are closely connected with the Tsumeb Corp. and the O'Okiep Copper Co., who are associated with the Newmont Mining Corp. of New York.

Geological and geophysical surveys have been carried out over an area of 100 sq. mi. Drilling is now in progress, but according to company officials, the deposits must be regarded merely as a promising prospect. It will take about another two years to obtain sufficient information to decide whether it is an economic proposition.

The area was last worked in 1927, but it was shut down then on the apparent lack of persistence at depth. A recent report of the Southern Rhodesian Geological Survey states that the generally accepted view of the geology of these mines is open to question.

● **Initial finance** for opening the new Bancroft Copper Mines in Northern Rhodesia reportedly has been raised.

This financing reportedly will bring in sufficient money to carry on until 1955. Estimated cost of bringing it to a milling capacity of 150,000 tons a month producing 4,000 short tons of blister copper in 1958 will be about $34-million.

A drilling program of 66 boreholes has disclosed three orebodies, consisting of impregnations of copper mineral of sedimentary beds, which outcrop or approach the surface and are generally mineralized from a shallow depth downwards.

Konkola Orebody was intersected by 22 boreholes and is estimated to contain proved reserves of 32.9-million short tons averaging 2.48% copper of which 0.45% is in oxide form, over a true width of 16 ft.

Kirila Bomwe Norther orebody, intersected by nine boreholes, is estimated to contain proved ore reserves of 13.1-million tons averaging 4.05% copper of which 0.15% is oxide over 13.5 ft.

Kirila Bomwe South orebody, intersected by 12 boreholes, is estimated to contain 4.52% copper, of which 0.49% is oxide over 22.4 ft.

In each orebody the deepest drilling has intersected ore of good depth and width and there is little doubt that additional tonnages of payable ore lie down dip from the proved areas. Total tonnage exposed by diamond drilling is estimated at 79.6-million tons averaging 3.6% copper. It is estimated that blister copper can be delivered to European markets at approximately $280 per long ton.

A concentrator will be erected at Kirila Bomwe, and the concentrates railed to the existing smelter of Rhokana Corp. at Nkana. On the basis of the estimated ore reserves calculated so far the mine should have a life of 40 years.

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IN AUSTRALIA

● **Large deposits** of bauxite in Arnhem Land, in Australia's Northern Territory, particularly on Machimbar Island, just off the coast, were reported recently by the Australian Aluminum Production Commission. The commission made the report after an extensive survey with the geological assistance of the Bureau of Mineral Resources.

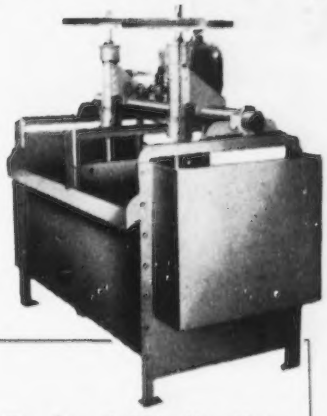
Meet another modern mill

Streamlined with AGITAIR®

Ore concentration in this modern mill is exclusively Agitair Flotation. The units are all 36" and the total mill capacity is 1500 tons . . . a streamlined copper operation in one of the great metal regions of the West.

Success here depends on both efficient metallurgy and low production costs. Agitair fits the formula both ways. This rugged machine, with great flexibility of control, yields economies right down the line — in maintenance, reagent consumption, wear and tear on mechanism and rubber parts.

For identified case histories involving metallurgical problems that concern you, write us today.



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Toronto, Canada
MONTREAL

Australia *(Continued)*

It estimated that deposits on Machimbar (for map, see page 208) would yield 10-million tons of bauxite with an available alumina content of 47%, sufficient to provide Australia's requirements for more than 100 years. The deposit was suitable for open cut mining and the bauxite could be loaded on ships with the provision of a small jetty on the lee side of the island, the report said.

In view of these factors, it was considered that the deposit could be commercially worked to provide Australia's demands and leave a substantial surplus for export. The commission was anxious to develop the project and was awaiting Government approval to start work.

● **Rich gold leases** have been taken over by Hansel Munday Gold Mining Co. N. L. in Western Australia. Three reefs are reported to be exposed on the property with a main shaft some 270 ft deep and in recent activities a grade of nearly 5½ oz to the ton was stated to be obtained.

Tonnage of ore reserves of Gold Mines of Kalgoorlie Ltd. was increased from 486,000 tons a year ago to 579,000 tons and the average grade is up from 6.3 dwt to 6.5 dwt a ton. The company bought the adjoining Paringa leases and plant.

● **Boulder Perseverance Ltd.** (controlled from the United Kingdom) reported that ore treated during its last financial year amounted to 134,737 long tons with an average grade of 4.989 dwt.

● **Aberfoyle Tin N. L. of Tasmania** has appropriated for new plant and futher development. The company has treated during the year 44,947 tons of ore for 580.6 tons of tin concentrates and 448.4 tons of wolfram concentrates. Ore reserves of Aberfoyle are now estimated at 287,301 tons of which 246,005 tons are proved reserves. This is a slight increase on last year's figures.

● **At Stawell, Victoria,** Gold Mines of Australia Ltd. has completed preparations for a drilling program on the Clunes Field. Leases at Creswick and Whipstick have been abandoned. Tests of outside leases are about to start in the vicinity of Morning Star Mine at Woods Point, Victoria. In the old mine a new inclined shaft is to be started in near future.

● **An increase** of 40% of the value of mineral output in the Northern Territory is in line with *Engineering & Mining Journal* earlier forecasts. Main metals mined there include gold, wolfram, mica and copper and shortly uranium will be added to this list. A considerable mining revival has been reported from the Northern Territory, particularly on the mineral fields north of Maranboy. At least two additional serious uranium discoveries during the year have stimulated general prospecting interest.

In-cycle Bolting Gives Immediate Roof Support

It's easy with O-B Shells and Plugs

In-cycle roof bolting works into face operations smoothly when O-B Shells and Plugs are in use. Bolting crews move into rooms, bolt them, and leave without a bit of lost time for the rest of the face crew. Swift bolting is possible with O-B Shells and Plugs because:

1. O-B Shells conform readily to hole diameters from $1\frac{7}{16}$ inches to $1\frac{5}{16}$ inches without any adjustment. Reasonable bit wear (with $1\frac{3}{8}$" bits) does not hamper bolt insertion.

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Better protection and better production result from in-cycle bolting, and it's practical when you use swift, sure O-B Shells and Plugs. They go up easy and they stay put!

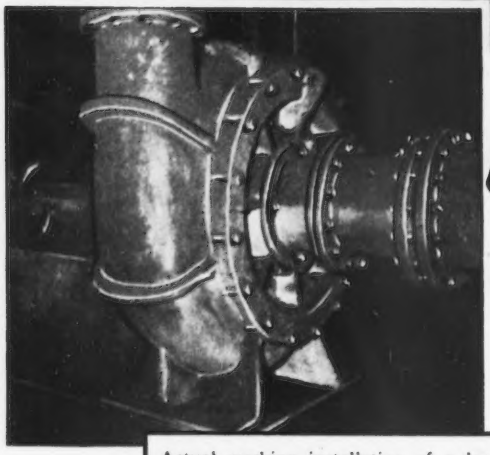
Two-man bolting crew has set 153 bolts with O-B shells and plugs during a 6½ hour period, and averages 90 bolts in a normal shift of that length, using 42-inch bolts!

O-B Expansion Shell and Plug for ¾-inch roof bolts and threaded rods, No. 21889. Illustration shows correct lap between shell and plug for speedy installation in roof.

A copy of this 20-page booklet on roof bolting is yours for the asking! Write for it. Ask for Publication 2768-M.

4333-M

Continuous Low-Wear Non-Clog Solids Pumping... *At Lower Cost*



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Morris engineers are always available to discuss and study your pumping problems with you. Describe your needs in a letter—or call your nearest Morris office. Our recommendations are free—entail no obligation. Write for Bulletin 175 which describes the Type M Solids Pump in detail.

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IN THE PHILIPPINES

● **Some interesting data** on the Toledo copper project in Cebu has been furnished by the management. A new company has been formed called the Atlas Consolidated Mining & Milling Company, controlled by Soriano interests. The property was originally drilled by the Mindanao Mother Lode Company in 1952 who turned it over to Soriano on a royalty basis. Since that time an intensive diamond drilling and tunnelling project has been carried out. Soriano has put down 6,600 feet of diamond drilling and done 1,260 feet of drifting and crosscutting in the orebody, which has been developed for some 1,300 feet of length, 600 feet width and 400 feet depth. Latest ore estimates are—6,050,000 tons of positive ore averaging 1.3% copper and 0.015 oz. gold and 6,800,000 tons indicated ore averaging 1.0% copper. The outcrop has been pushed up to the northeast and has been followed for three kilometers from the main workings.

Plans are said to call for immediate erection of a mill with a capacity of 400 tons per day. Much of the equipment will be moved down from the old Masbate mill, formerly the largest low-grade gold mine in the Philippines. It is hoped to have the mill in operation in 1954. It is expected that mining costs will be low as the orebody will be mined by open cut with little overburden to strip. According to preliminary tests the ore will be easy to float, and a 90% extraction can be made on a 100% minus 48 mesh grind.

The property is located not far from the coast and transportation will not be costly. It will be necessary to build a power plant and loading facilities at tidewater, besides providing for the mine crew.

The personnel consists of Colonel Charles Smith, manager of mining operations, C. A. Weekly, chief metallurgist, Dan Lewis, chief geologist, and George Scholey, chief engineer. All these men have had extensive pre-war experience with Philippine mines.

Besides the mill equipment that is to be moved from the Masbate mill orders have been placed abroad for additional machinery. The basic engineering work on design of mill, crushing plant, machine shop, etc. has been completed. Negotiation is in progress with the Japanese for purchase of a steam plant, and a loan of $750,000 in the form of equipment is expected from Japanese sources. In addition to the value of the copper expected to be produced, the company expects to realize an additional profit from sale of pyrites to be recovered, for which a large market exists in the Orient.

Soriano interests are also actively developing the Mati iron project near

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CATALOGS are available on any "PAYLOADER": 4-wheel-drive Models HM — 1½ cu. yd. and HR — 1 cu. yd.; rear-wheel drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; front-wheel-drive Models HAH — ½ yd., HA — ½ cu. ft.

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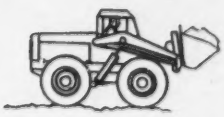
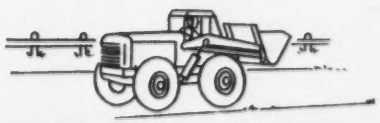


Big tires and 4-wheel-drive for traction and flotation



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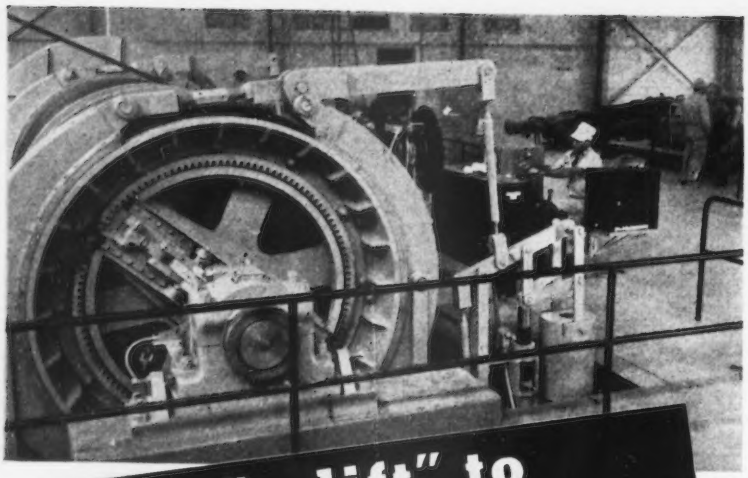

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Each drum is cast Meehanite®...84" diameter with 78" face, winding 1,200 feet of 1⅜" cable. One drum is fixed and the other clutched. Brakes are set by gravity and released hydraulically. Drums are fitted on 10" shafts with three self-aligning bearings, with two such bearings serving the 6" pinion shaft.

Rating is 22,000 lbs. rope pull at 1,000 ft. per minute rope speed.

Stearns-Roger

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Philippines *(Continued)*

Davao, Mindanao. Ore reserves are said to total over 2,000,000 tons, averaging 63% iron. A party of Japanese steel technicians has visited the property to finalize a contract to sell lump ore and concentrates to Japanese steel mills. Under the terms of the proposed contract the high sulphur conconcentrates will be sold at $8 per ton FOB Mati for 60% base ore; and $9 for low sulphur concentrates. The Mati property was prospected before the war by Elizalde interests.

● **Mindanao Mother Lode Mines Inc.**, which holds several gold lode claims near Surigao on the island of Mindanao is suspending operations, it has been reported. According to reports, Mindanao's directors instructed Smith Emenel, mine official at Surigao, to shut down production as soon as possible. Reason acribed to the shutdown was the exhaustion of profitable ores. Last year the company abandoned the 1,300 ft. level. Stockholders were told that a search for suitable ores would continue.

IN ASIA

JAPAN

● **Japan's three aluminum smelter firms**, Japan Light Metal Co., Showa Denko Co., and Sumitomo Chemical Co., plan to produce 52,600 metric tons of aluminum next year, compared with this year's output of 46,240 tons. The increase is to meet predicted expansion of domestic and foreign demands.

This year's production estimates and next year's plan of the three firms are as follows:

	Metric Tons	
	1953 Estimates	1954 Plan
Kambara plant, Japan Light Metal	26,000	28,000
Kitakata plant, Showa Denko	6,900	8,600
Omachi plant, Showa Denko	4,360	6,500
Kikumoto plant, Sumitomo Chemical	8,980	9,500
Total	46,240	52,600

Growing domestic demand for aluminum is attributed to increased need for wire by electric power development projects and to rising sales of aluminum kitchen ware. Export of aluminum for this year is estimated at about 8,000 tons, an increase of 60% from last year. Bulk of the export is to the U.S. and South America.

● **In Tokyo**, it was announced that the British Metal Corporation has contracted to supply 2,000 tons of Australian lead concentrate to the Mitsubishi Metal Mining Co. in October, a

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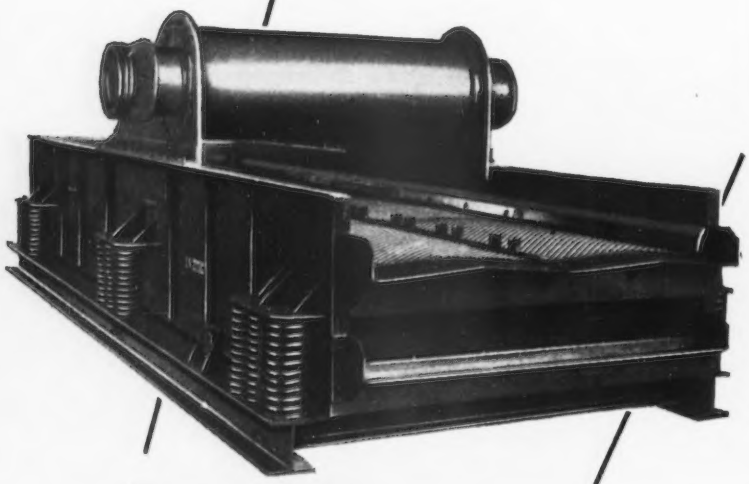

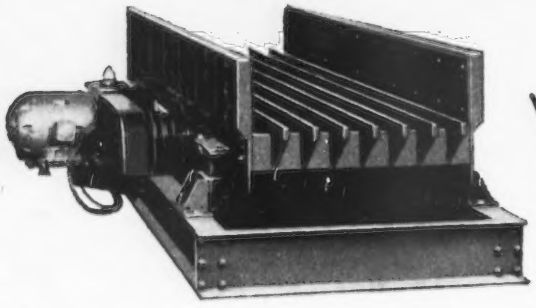

Simplicity heavy duty scalpers handle many tough production jobs for the metal mining industry.

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Japan *(Continued)*

spokesman for the latter company has disclosed. He said this was in addition to the 1,000 tons covered by an earlier agreement.

The Mitsubishi company, one of the leading non-ferrous metal producers in Japan, negotiated the additional imports because lead prices in Japan have been soaring, it was stated.

MALAYA

● **Although a number** of tin mines have closed, leaving a total of 619 operating at the end of July, compared with 632 in June, July production was higher, totalling 4,706 tons, compared with 4,262 for June. The number of workers in the industry fell from 39,390 to 37,909.

Higher output is explained by local sources in that a number of mines, especially gravel pump types, worked higher grade ground. At the end of July, mines fell into the following categories:

74	dredges
476	gravel pumps
10	hydraulic units
3	open cast mines
11	underground works
45	other small workings

August shipments were 5,745 tons, compared with 5,257 tons in July. Eight months total is 42,365 tons, as compared with 42,057 in the first eight months of 1952. Aug. production figures are available for a few individual mines:

Austral Malay Thabawleik mine	37.2 tons
Pumgah	36.0 tons
Austral Amalgamated Asum kumbang	18.8 tons
Puchong	82.6 tons
Sungei Bidor Tin Dredging Ltd.	41.0 tons
Kesang Tin Ltd.	13.6 tons

Low price of tin combined with taxes make dredging of low grade ground in Malaya uneconomical. Even in medium grade fields it is felt that depreciation of material and amortization of resources used are no more than met, at the present price of tin.

● **A newly formed** Malayan Mines Co. will begin work early next year at a disused iron mine 12 mi. north of Batu Pahat in Johore, said to be capable of producing between 30,000 and 40,000 tons a month, the Singapore Standard reports.

The company's manager, Tan Cheng Chua, the newspaper said, would shortly leave for Japan to negotiate a contract under which it was hoped the Japanese would take the whole production of the mine at an estimated yearly cost of about $4-million.

Bulldozers and tractors are now stated to be busy levelling and clearing roads leading to the mine.

● **Malaya exported** 4,727 long tons of tin in September, compared with 5,745 long tons in August, according to the Registrar of Malayan Statistics.

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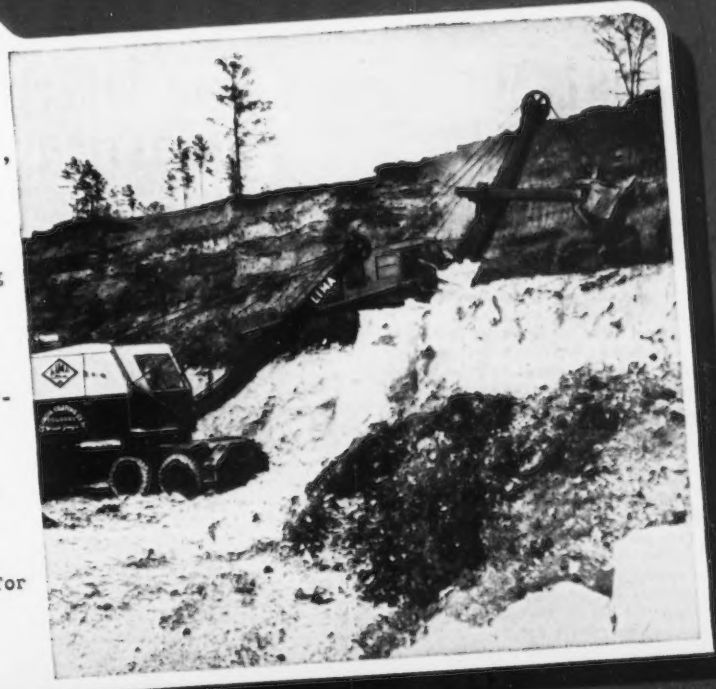

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Malaya *(Continued)*

September shipments comprised 361 tons to the United Kingdom, 2,065 tons to the United States, 1,078 tons to the Continent, 604 tons to British possessions and 619 tons to other countries.

PAKISTAN

● **Good progress** of the Pakistan mining industry in the first half of 1953 is shown by the following statistics released in Karachi:

	Jan./June '53		Jan./June '52
Chromite..... (including chromite for export).....	11,129.25 tons 9,501	tons	9,368 tons
Limestone.....	411,847	tons	333,899 tons
Gypsum.....	12,469	tons	13,753 tons

CHINA

● **The Communist Chinese** News Agency reports that a Chinese scientific expedition has returned to Peking after two years in Tibet, and has discovered 30 classes of ore deposits there including copper, iron, lead, zinc and manganese.

NEAR EAST

GREECE

● **Representatives** of the Canadian Aluminium Co. have arrived in Greece to study a project for refining locally-produced bauxite on the spot, it was reported in Athens. At present, all the bauxite mined in Greece is shipped abroad for processing — mainly to Germany.

● **Half-way mark** in reopening the famed nickel mine at Larymna north of Athens has been reached. Prodkomos Athanassiades, the Greek industrialist who is spending more than $7-million on the project, expects it will be in production in another year.

The mine, once second in Europe to the Petsamo mine on the Russian-Finnish border, was gutted and filled in by successive destruction by Italian and German occupying forces in World War II and Greek Communist guerillas in the civil war that followed. Its annual output was 50,000 tons of nickel ore.

Athanassiades also is installing a preliminary refining plant under license from Krupp to raise the ore content of the exportable product. Siemens is providing an electric furnace that can handle 140,000 tons of ore and coke annually. A yearly output of 60,000 tons is the aim.

The mine and plant eventually will employ 2,000 men. Athanassiades ob-

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Euclids have payload capacities of 10, 15, 22, 34 and 50 tons. Because they are matched to various sizes of loading and crushing equipment, "Eucs" provide a well balanced operation for open pit haulage and increase the efficiency of the loading unit.

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Powered by diesel engines of 125 to 600 h.p. "Eucs" have top speeds with full payload, up to 36 m.p.h. Five and ten speed transmission, or torque converter with semi-automatic transmission available. The favorable ratio of horsepower to payload means more pay tons hauled every trip.

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"Eucs" are efficient for moving any material on any length of haul; handle overburden, rock, coal, ore and other materials loaded by shovels, draglines, transfer hoppers and mobile loading equipment.

If you are interested in higher production at lower cost, have your nearby Euclid Distributor show you what "Eucs" are doing on work similar to yours. He'll be glad to make a hauling cost estimate for your job—no obligation, of course.

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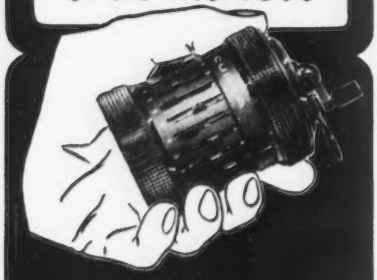

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BIRDSBORO-BUCHANAN jaw crusher, one of the largest in the world, as it was being installed at iron ore deposits of the Marcona Mining Co., 450 kilometers south of Lima, Peru, near the port of San Juan. It was expected that this crusher would be in operation by press time. The crusher has a rated capacity of 1,000 tons an hour.

Greece *(Continued)*

tained the mine from the Greek government after international bidding. He will give Greece 1% of the finished product in payment for the lease.

TURKEY

● **In Istanbul,** it was reported that there have been some rather sizable shipments of Turkish minerals to Europe recently. One shipment via Izmir, consisted of 1,000 tons of chrome ore for Austria while in another case 1,500 tons of manganese ore were shipped from Izmir to Genoa, with destinations in other European countries.

Mineral exporters here say that although they are still receiving plenty of inquiries from abroad, it is becoming more difficult to export minerals. The reason for this is that Turkish prices have remained unchanged from the high level ruling at the time of the Korean crisis, while elsewhere sharp declines have been noted since then, they assert.

IRAQ

● **Iraq government** has decided to start large operations to utilize Iraq mineral deposits, mainly coal, iron, and gold, and has invited Austrian geologists to take part in the exploration programs, according to reports from Vienna. A number of Iraqi students are to be sent to Austria to study at the Montan School at Leoben, Styria province.

EGYPT

● **Egyptian Mines & Quarries Administration** has begun an experimental service in Mersa Alam in an effort to encourage exploitation of Egypt's wealth in precious metals.

In the Mersa Alam region, where ancient Egyptians mined gold, tests of certain minerals already have been made. Results of these tests will be published for the public and mining companies, in the hope of attracting capital to such development.

IN EUROPE

AUSTRIA

● **Output of** virgin aluminum in Austria during the first six months of the current year amounted to 20,555 tons against 16,776 tons in the comparable period a year earlier. Production of aluminum sheet reached 4,611 tons (4,128 tons) and that of aluminum wire 2,596 tons (1,829 tons).

Lead output comprised 4,546 tons (4,202) of soft lead and 812 tons (652) tons of hard lead. Electrolytic copper output amounted to 4,340 tons (3,021) and that of refined copper to 1,114 tons (1,409).

Aluminum products exports totalled 164 million schillings in Jan./June

Synchronized Power

writes earth-moving success story

One of Roy Kohl's five scrapers hauling a 24-yard load at Lockbourne Air Force Base. On this 212,000-yard job, the scrapers load in 90 seconds and travel to the spreading site at 30 mph.

In 1949, Roy Kohl was a basement excavating contractor in Ohio. During the last four years he has changed his operation and has moved more than 2½ million yards of ore, earth and clay on many types of big jobs.

His success story is built around the operation of 5 tandem-engine Euclid scrapers. The tandem-engine application—one pulling and one pushing—was made possible by Allison TORQMATIC DRIVES which synchronize the power of both engines through a simple control.

Kohl, like other operators, has found that Allison matched Torque Converters and hydraulic Transmissions contribute many ways to the more successful use of heavy-duty equipment. Most important, of course, is the ease of operation; the engines' ability to work at peak efficiency; and the cushioning effect which eliminates harmful shock on engines and the entire drive line.

Kohl reports his "Eucs" operate under all conditions, and climb up to 50% grades under full load. The five units now average over 2,000 hours a year. His first scraper moved more than a million yards without any major maintenance on Converter or Transmission.

Your dealer can give you more information about low-cost equipment maintenance where Allison TORQMATIC DRIVES are installed or you may wish to write Allison direct for full particulars.

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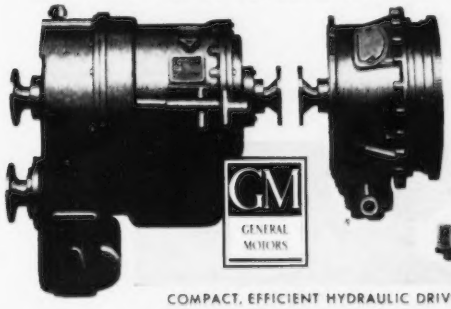

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E&MJ Special Report

Labrador Iron Ore Shipments to Start Next Year
10 Million Ton Production Planned For 1955

R. E. COCHRAN
Cleveland Office, McGraw-Hill

MANAGEMENT OF THE Iron Ore Company of Canada expects to produce 2-million tons of iron ore in 1954 from the huge deposits on the Hollinger-Hanna holding in Labrador and Quebec, it was reported late last month.

This should be enough to "shake down" the equipment and the organization of working and supervisory forces. From this tonnage a big jump to 10-million in 1955 is planned. Any output greater than 10-million will have to wait until the St. Lawrence Seaway is an actuality.

Shipment of 10-million tons a year, the management figures, will mean hauling seven trains per day of approximately 11,000 tons payload each throughout a prospective rail shipping season of 150 to 160 days per year. Each train will consist of 115 to 117 specially designed 95-ton cars, pulled by a four-unit diesel locomotive. The cars actually have a maximum load capacity of 97 tons through use of 36-in. wheels instead of the conventional 33-in. size. Car length is 31 ft. 9 in. Rail weight per yard is 132 lb. Time required for the run to dock side is estimated at 16 hours. The grade will favor the load.

Rolling Stock

Rolling stock planned for the start of operations comprises 2,000 cars and 53 diesel locomotive units, also 175 ballast cars, of which 135 have been delivered and put in service, as well as camp cars for maintenance crews.

Ore cars will be made up into trains in an assembly yard at Knob Lake. One diesel locomotive per train will be used for gathering.

About 78½% of the grading on the right of way was completed by Aug. 1, 1953, with steel at the 186 mile mark and 174 miles to go. About 83½% of the clearing has been completed. The clearing from Milepost 225 to Knob Lake is of little consequence. (For picture story, see *E&MJ*, August, 1953, page 78.)

Along the railroad, all structures are installed, except three which are of little consequence. All material is arriving on schedule or before. Rock work is practically completed and muskeg has not been too big a problem to date. Where drainage will permit, it is being compressed by fill on top, then rolled. Otherwise the muskeg, rarely as much as 6 ft. deep, is being removed and the area filled. Ballast material is less plentiful than anticipated and a rock crusher is being erected to provide it.

Talk is current that it will be far better to keep the railroad open during the winter, some sort of service being maintained, than to let it become snowbound. No ore would be carried but supplies could be brought into Knob Lake for residents and field operations during the following summer season.

When Mining Starts

Ruth Lake No. 3 is the first deposit to be opened for mining, although fine low-grade ore from Ferriman No. 3 will first be shipped from Knob Lake to Seven Islands to build a base for the ore stockpiles. All mining in 1954 will be done at Ruth Lake No. 3. The ore is hard, has already been stripped, and footings have been going in for the screening and crushing plant. Lumps are to be sized down to 6 in.

In 1955 Ferriman Nos. 3 and 5 will be put into production and the following year Burnt Creek deposits Nos. 1, 3 and 6, with two 6-yard shovels per pit will also begin producing. Ferriman Nos. 3 and 5 will be mined together, as will Burnt Creek Nos. 1, 3 and 6.

Draglines will not be needed for removing overburden, although a drag may be used in some places to get at the ore the big shovels cannot reach. Some 2½-yd. shovels will also be available for that type of mining. IOC expects to use churn drills in mining but admit they are watching carefully the progress made with rotary drills. A firm decision has not yet been reached.

Mesabi Mining Methods

All in all, actual mining is expected to follow Mesabi practice closely, using 30-ton Euclid trucks and conveyors to get the ore to the screening plant. From there it will be fed by gravity direct to railroad cars. Initially the staff is thinking in terms of 30 of these trucks. Blasting practice and explosives will be like those used on the Mesabi. In the pits a 60-ft. bank with a 20-ft. beam is planned. Approach roads will have 3 ft. of rock base covered with gravel. Pit roads will be built of available material. Conventional equipment will be used for road maintenance. Water supply or disposal offer no unusual problems. In an average year stripping can be done well into December. This will be enough to expose the ore required the following season.

A modern maintenance and repair shop has recently been built at Burnt Creek as a permanent installation. A strictly preventative maintenance program will be followed, once production is started—in fact such a program is in effect now at Knob Lake.

The supervisory force for the mines is pretty well set even now, with a few Mesabi men to give the others the benefit of their knowledge. Old timers at Burnt Creek are being given experience in stripping and shovel work, drilling, and blasting to sharpen their readiness.

Many questions remain to be answered, such as what to do with men the management cannot afford to lose during the period from January to May.

Early in July one of three workmen's barracks, to house 150 men, was completed at Knob Lake. The 14 cottages now at Burnt Creek were to be moved the approximate 5 miles to the new town at Knob Lake as the first units. In addition the company expects to build 8 to 10 additional houses. The total number is still undetermined, with figures ranging from 300 to 500, not counting buildings for the store, theatre and the like.

An oil-fired central-heating system is being installed at Knob Lake for residences, workmen's barracks, warehouses, etc. and sufficient oil storage tanks will be provided.

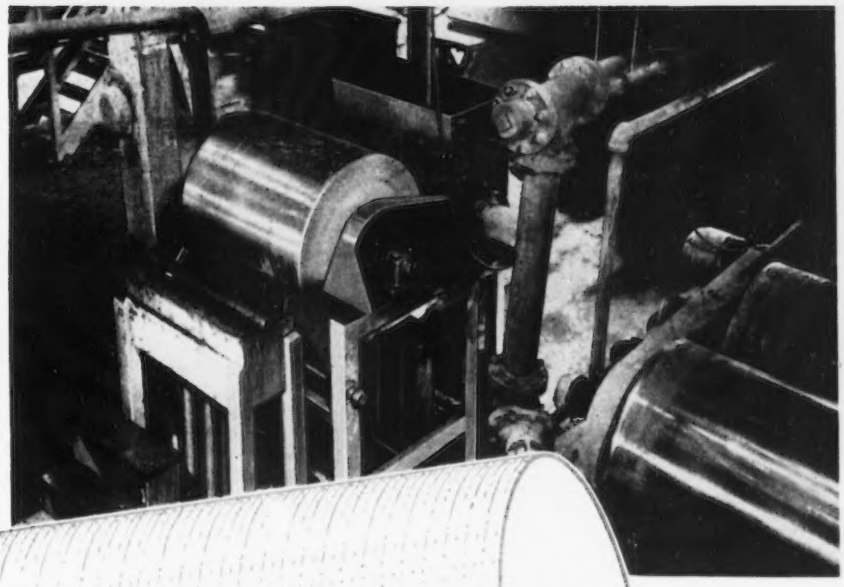
Where mosquitoes and flies are a problem the areas will be sprayed, it is planned.

Ore-Loading Dock

Construction of the ore-loading dock at Seven Islands (the harbor there is a natural one) and related structures and installations, such as dumping bins, screening plant, conveyor lines, storage yards, and holding track yard, by the contractors working for IOC is about 60% completed. All should be ready by June 1, 1954 at the present rate of construction. Concrete work on the dock there should be complete very soon and steel work by Jan. 1, next. There will be 1,600 ft. of IOC dock and an additional 600 ft. adjoining of government-owned dock.

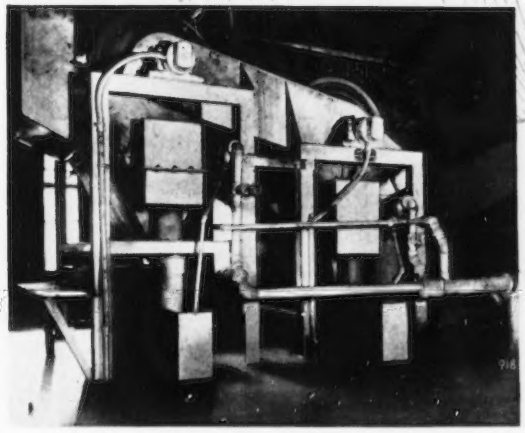
The housing project at Seven Islands was hardly under way at the outset of summer, with about 30 houses completed of the estimated 300 that will be needed.

Iron Ore Co. of Canada's proved ore reserves in the Quebec-Labrador area are still reported at 440-million tons. A limited amount of exploration work remains to be done by geologists and field engineers outside the concession held by Hollinger-Hanna Ltd. and Iron Ore Co. It is understood that decision has practically been reached by the company as to the areas that are to be freed under the agreement with the Quebec government. Those that will be retained in Quebec approximate 200 of the 250 sq. mi. permitted under the agreement, it was disclosed.



Jeffrey Counterflow Rougher and a Two-Drum Jeffrey-Steffensen Separator at Scrub Oaks

Jeffrey Drum-Type Magnetic Separators Simplify Flowsheets, Increase Recoveries



Type C-2 Cobbers in operation at Oxford

Alan Wood Steel Company, Conshohocken, Pa., has simplified flowsheets and improved metallurgy by converting its mills at Scrub Oaks and Oxford to Jeffrey Drum-Type Magnetic Separators. The installations have resulted in an increase in recovery and sizable savings in floor space requirements.

Scrub Oaks mill will utilize 11 drums, including Type C-2 Cobbers for primary roughing . . . Counter-flow Type Roughers on both rod and ball mill products . . . Jeffrey-Steffensen Two-Drum Separators for final concentration of fine products.

At Oxford two Type C-2 Cobbers with a common drive handle +20 mesh portion of roll crusher product, producing a final concentrate, a low-grade tailing, and a middling product that returns to crusher in closed circuit.

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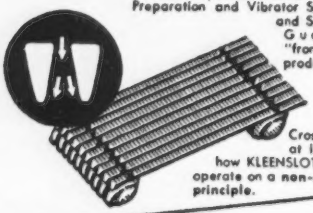
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Austria *(Continued)*

against 109.4 million schillings a year earlier. They comprised 140.6 million schillings worth of virgin aluminum and aluminum alloys and 23.4 million worth of semi-fabricates. The U. S. was the main customer, taking 99 million schillings worth followed by Western Germany (20.3 million), Italy (12.2 million) and Belgium/Luxembourg (3.4 million).

● **Bulgaria** is to receive mining equipment from Austria during 1953, according to a recently signed trade agreement. Czechoslovakia will receive large amounts of magnesite within the mutual $18,000,000 exchange for the Nov. 1, 1952 to Dec. 31, 1953 period. The latter trade agreement has been several times interrupted, due to the Czechs' unwillingness to deliver the requested amounts of coal to Austria.

CZECHOSLOVAKIA

● **Inhabitants** of the villages of Voishenk and Gruenval have received orders to leave their homes for other locations, because of Communist plans to mine the uranium ores found last year near these two communities.

Reports from this Slovakian area say that forced laborers and political prisoners will take the two villages over, upon starting mining operations. The regular Czech Army is to guard the area.

GERMANY

● **West German** production of iron ore in Aug. was 1,150,000 tons with an iron content of 307,741 tons. This compares with 1,220,000 tons with an iron content of 324,577 tons in July, according to figures released by the Government Office of Statistics.

ITALY

● **Recent journey** and conversations of the vice-president of the Montecatini Co. in the United States have been connected in the Italian press with a plan, for erecting, at Manfredonia, works for producing aluminum from bauxite beds near there by Bayer's process, while at the same time extracting iron from the residue of red mud to be used on the spot for obtaining pig-iron.

Until now the bauxite from the rich beds of Manfredonia has been carried by sea to the refineries at Porto Marghera (Venice).

The erection on the spot of aluminum works now made possible by an adequate supply of electric power that can be obtained in that area, would allow of a marked reduction of the cost of producing aluminum in Italy. This reduction would be still more considerable if a plant were erected near the refinery for obtaining iron from the muds. As is known, the Bayer process uses only part—less than half—of the metallic content of the bauxite and all the iron and titanium content is wasted.

SPAIN

● **Ricardo Medem y Cie.** of Madrid is to ship 4 metric tons of wolfram and 2,000 kilograms (2 metric tons) of scheelite to Austria. The sale of Spanish metals was permitted by the General Directorate of the Spanish Trade Policy Commission, it was announced in Vienna.

IN SCANDINAVIA

NORWAY

● **A/S Sydvaranger** of Kirkenes shipped 66,500 tons of iron ore in Aug. The total comprised 61,000 tons sent to West Germany and 5,500 tons to Britain.

It is expected that the total of exports for 1953 will amount to 830,000 tons. Annual production of iron ore is estimated at one million tons.

Zenda Placers Tin

(Continued from page 100)

not been attempted by anyone so far. Only small scale sluicing on the richest tin bearing creeks has been carried out to date. One or two such small operations are still going on," he added.

"It is believed," Snyder continued, "that when the properties are fully developed and the operating problems solved, Zenda will have a major operation and be a substantial producer of tin metal."

Snyder paid tribute to DMEA and to the Bureau of Mines for their cooperation. In 1951, he said, an application was made for a DMA loan of $54,000 to drill Cape Creek and Last Chance Creek, Zenda furnishing matching funds of $6,000. This loan was granted but drilling did not get underway until the summer of 1952. Application for a second $54,000 loan was granted in July, 1952. This money is being used to drill Boulder Creek. A fourth amendment was negotiated in July, 1953, for a loan to cover drilling of a third creek and to make analyses for rare metals reported by one analyst. This money has been granted but not yet used.

"There is no question as to the

"Attach the detonating cap properly . . . Primacord will do its job safely, effectively

"This is the last job before the blast. Holes are loaded with a branch line in each one. You've laid your trunk line and connected your branch lines at right angles to it. Men and machines have been removed. You've checked and double-checked – everything's ready.

"*Now* attach the detonating cap to the Primacord. Up to this point, your blast – hooked up with Primacord – cannot be set off by sparks, friction, ordinary shock or stray electric currents. Primacord *must* be detonated with a blasting cap attached to one end of the trunk line.

"Place the cap and fuse alongside the end of the Primacord trunk line and bind together lightly but firmly with friction tape. Don't tie them together with string or wire – don't lay them under a rock! Place the cap gently on the ground and lay out your length of safety fuse*.

"Remember – in blasting, safety is a sign of skill. Be careful, all-ways."

Ask your explosives supplier, or write for further facts to

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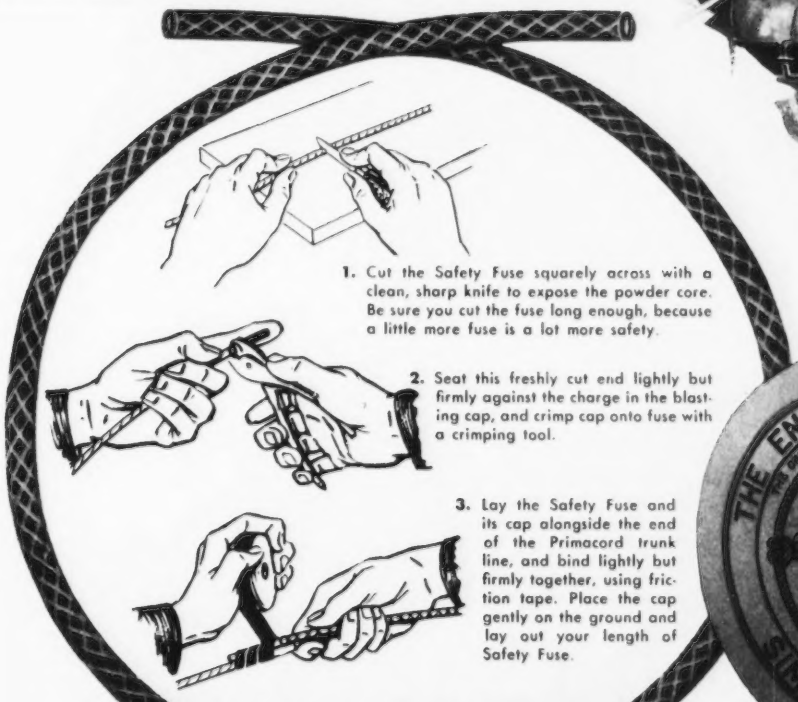
*Primacord can also be detonated with an electric blasting cap.



1. Cut the Safety Fuse squarely across with a clean, sharp knife to expose the powder core. Be sure you cut the fuse long enough, because a little more fuse is a lot more safety.

2. Seat this freshly cut end lightly but firmly against the charge in the blasting cap, and crimp cap onto fuse with a crimping tool.

3. Lay the Safety Fuse and its cap alongside the end of the Primacord trunk line, and bind lightly but firmly together, using friction tape. Place the cap gently on the ground and lay out your length of Safety Fuse.

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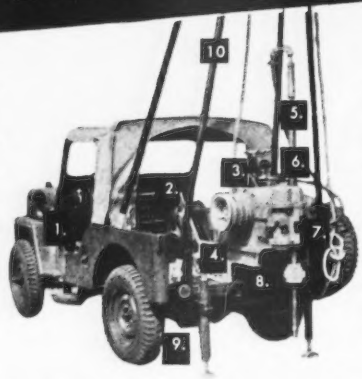

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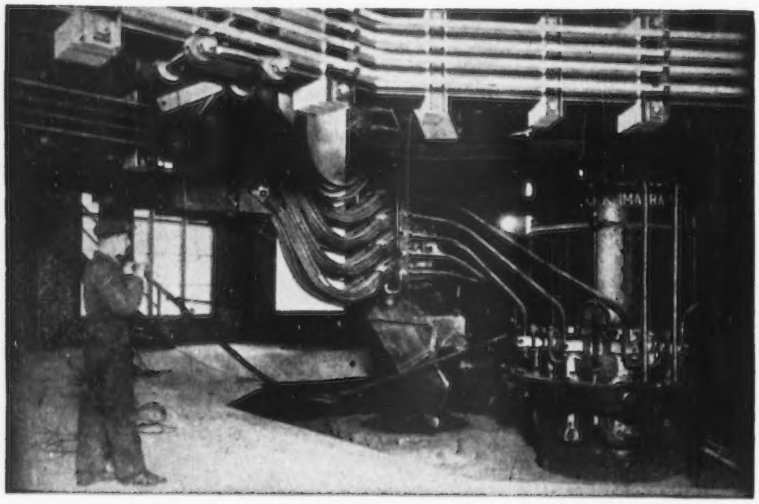

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Zenda *(Continued)*

benefit derived by the DMEA program," Snyder stated. "Parts of Alaska are isolated and are out of the usual commercial area. Without government assistance this important tin deposit would probably not have been developed.

"All the other tin mining operations now in effect in this area are due to government loans," Snyder stated. "Without the DMEA program a probable new industry for Alaska would not have been established."

(For other news of tin mining in Alaska, see page 134.)

Plastics in Mining

(Continued from page 89)

ing maintained by these industries in plastic automobile bodies. It will not be surprising to see steel producers enter into the plastics field in the near future since this move would be good insurance against future losses in sales to the automotive industry.

The plastics vs. metals development shaping up will bear careful study by the minerals industry. Those mineral producers who are following the diversification trend now fashionable in every branch of industry will do well to keep an eye on plastics. Plastics will have an important place in the future of the mineral industry.

In summary it might be stressed that the production of plastics offers new markets for certain metals and pigments. For instance polyvinyls, now being produced at the rate of 400-million lb. per year require certain stabilizers. Over 12 different lead compounds have been developed as stabilizers. Lead constitutes 1½ to 2½% by weight of those polyvinyls using lead compounds as stabilizers.

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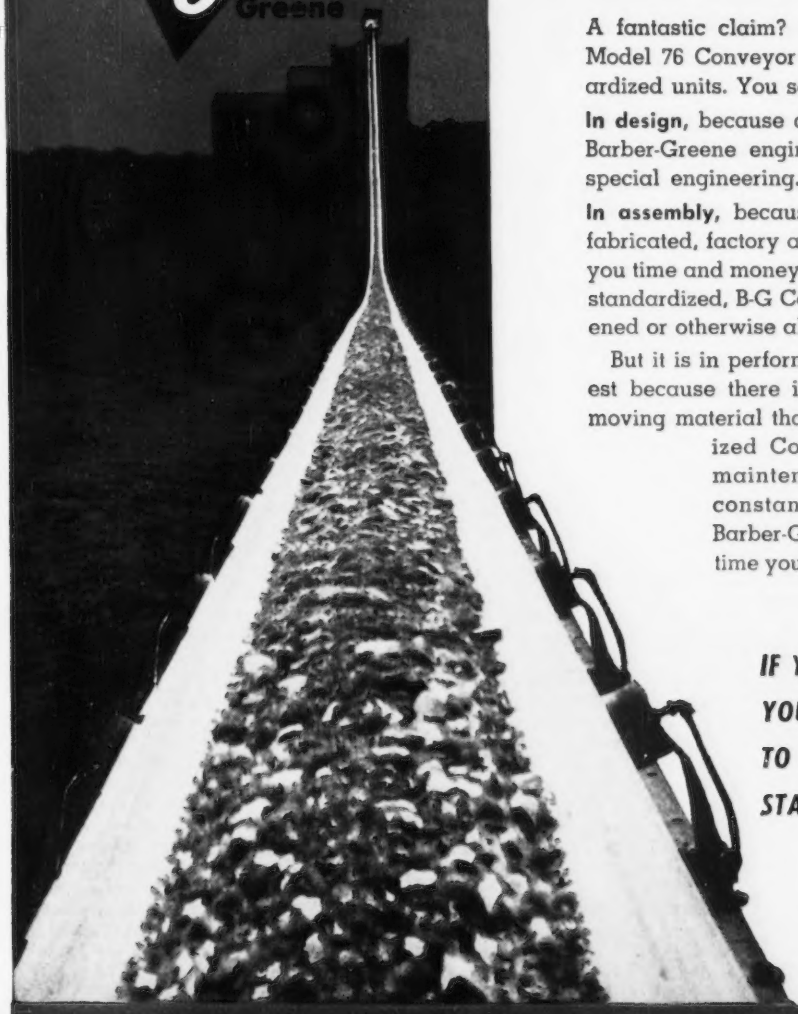

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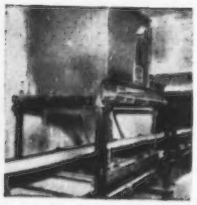

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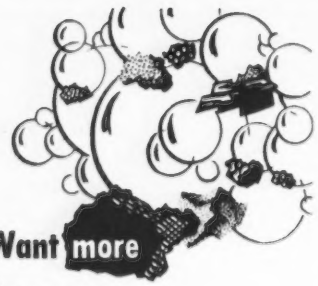

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The Physical Chemistry of Copper Smelting. By R. W. Ruddle. Subjects covered include: an outline of smelting practice, the constitution of matte, the constitution of copper smelting slags, the formation of magnetite, copper losses in smelting and converting, the recovery of sulphur from smelter gases, the elimination of impurities during copper smelting. Published by the Institute of Mining and Metallurgy, Salisbury House, Finsbury Circus, London E. C. 2. Pp. 156. Price £1 per copy (10s to members.)

The Physical Chemistry of Metals. A symposium on molten slags and salts, including the following papers: "The Constitution of Liquid Silicates," by Dr. J. O. M. Bockris. "Some Aspects of the Constitution of Liquid Oxides," by Dr. J. W. Tomlinson. "Anomalies in the Surface Tension of Silicates," by Dr. T. B. King. "The Correlation between Activity Composition in Mixtures of Fused Salts," by Dr. H. Flood, Dr. T. Forland, and K. Grjotheim. "Heats of Mixing in the System Ferrous Oxide-Silica in the Liquid State," by Prof. M. Rey. "Thermodynamic Aspects of Molten Slags," by Dr. F. D. Richardson. Published by the Institution of Mining and Metallurgy, Salisbury House, Finsbury Circus, London E. C. 2. Pp. 106. Price 15s. per copy (7s.6d. to members.)

Engineering Drawing. By J. V. Lombardo, Queens College; L. O. Johnson, New York University; and W. I. Short, University of Pittsburgh. Edited by A. J. Lombardo, New York University. A paper-covered pocket-size edition for elementary courses in engineering colleges. Published by Barnes & Noble, Inc. 105 Fifth Ave., New York 3, N. Y. Pp. 432. Price $2.00.

Zweiten Monographie der Deutschen Blei-Zink-Erzlagerstätten. Die Erzgänge von Andreasberg im Rahmen des Mittelharz-Ganggebietes. By Dr. Albrecht Wilke, Clausthal-Zellerfeld. Photomicrographs related to the sequence of mineralization in this area are unusually well done. The correlation between various phases of structural deformation and mineralization are thoroughly covered and amplified by the liberal use of drawings and photographs. Published by Gesellschaft Deutscher Metallhütten und Bergleute E. V., Clausthal-Zellerfeld 1, Paul-Ernst Strasse 10, Germany. Pp. 186 plus numerous plates. Price 26.50 DM.

Bulletin 30. Pre-Cambrian Geology of the Picuris Range North-Central New Mexico. By Arthur Montgomery. Published by the State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining & Technology, Campus Station, Cocorro, N. M. Pp. 89 plus maps.

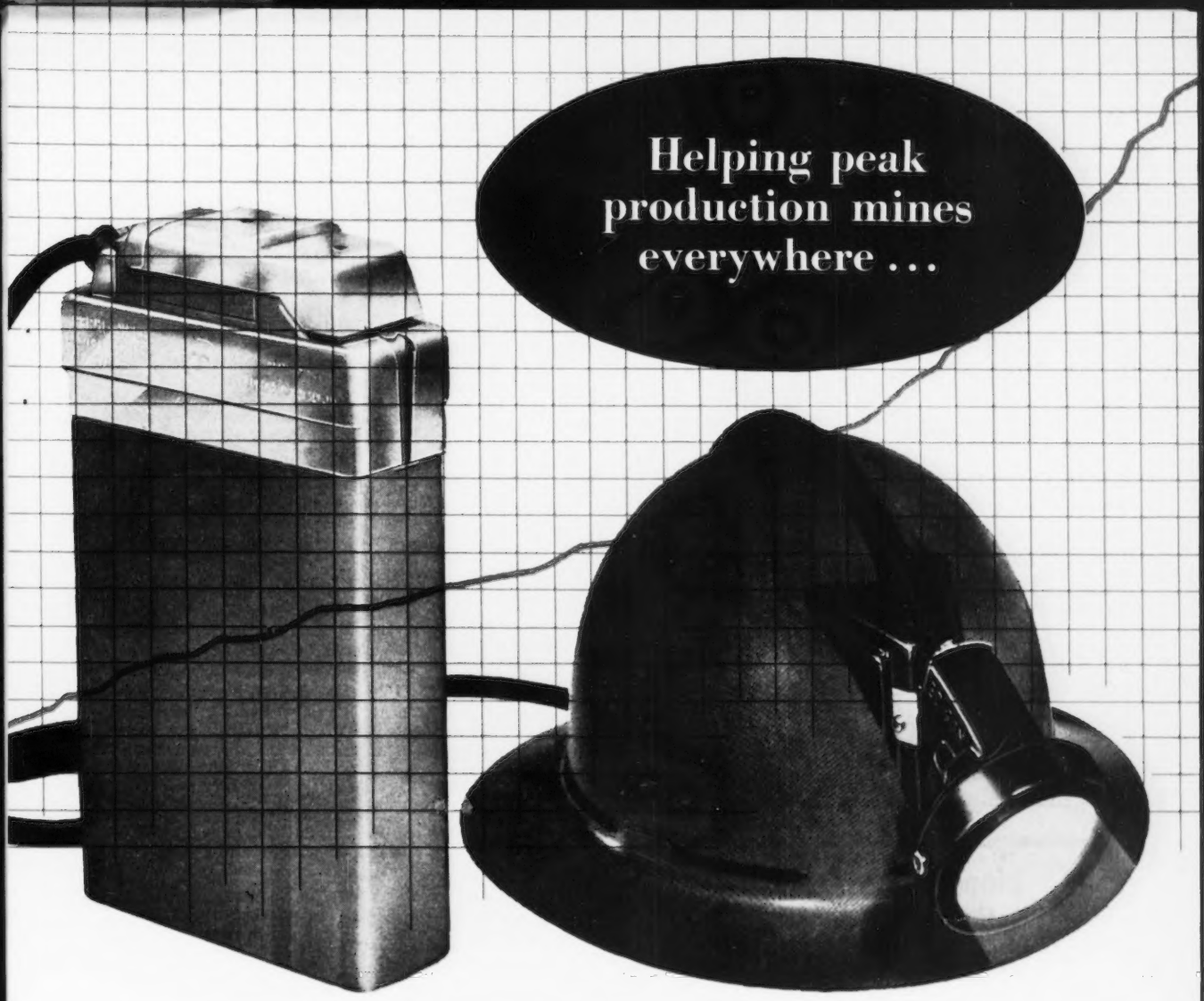
Geology and Mineral Deposits of Pre-Cambrian Rocks of the Van Hohn Area, Texas. By Philip B. King and Peter T. Flawn. Published by the University of Texas, Bureau of Economic Geology, Austin 12, Texas. Pp. 218 plus 24 text fig. and 36 plates. Price $5.75 cloth bound, $5.00 paper-covered.

Studies on the Separation of the Rare Earths and Their Accompanying Elements. By Zenzi Hagiwara. Part I. Separation of the Rare Earths by Using Hydrolysis of a Buffered Solution. Part II. Precipitation of Rare Earths, Thorium, and Zirconium from Homogenous Solutions. Separation of Thorium and Zirconium from Some Lanthanons. Part III. Separation of Cerium from Rare Earths. Part IV. Indirect Determination of Some Elements Such as Samarium and Yttrium. Published in the Technology Reports of the Tohoku University, Sendai, Japan, Vol. XVII, No. 1. Pp. 32.

Simplified Design of Roof Trusses for Architects and Builders. Second Edition. By Harry Parker, Professor of Architectural Construction, University of Pennsylvania. Numerous changes have been made in this second edition to improve sections on the design of steel and wooden roof trusses. This pocket-size handbook should prove helpful in mine plant design, especially because it covers both wood and steel trusses. Published by John Wiley & Sons, Inc. 440 Fourth Ave., New York 16, N. Y. Pp. 278. Price $4.00.

Outlines of Structural Geology. Third Edition. By E. Sherbon Hills, Professor of Geology and Mineralogy, University of Melbourne. Published by John Wiley & Sons, Inc. 440 Fourth Ave., New York 16, N. Y. Pp. 182. Price $3.00..

Sulphur. System No. 9, Section B1 of the 8th edition of GMELIN'S Handbook of Inorganic Chemistry. Edited



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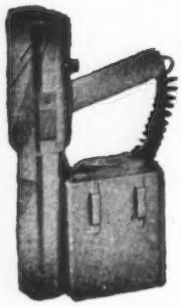

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by the Gmelin Institute. Part B of System No. 9 of the Gmelin series covers the compounds of sulphur. Section B1, published in May 1953 covers sulphur hydrites and oxides. The formation of hydrogen sulphide, its equilibrium, and the composition of H_2S are thoroughly expounded. Of particular interest are the sections dealing with the combustion of H_2S and its reactions with metals. Published in German by Verlag Chemie, GmbH, Weinheim/Bergstrasse, West Germany. Available in the U.S.A. through Walter J. Johnson Inc., 125 E. 23 St., New York 10, N. Y.; and Stechert-Hafner, Inc., 31 E. 10 St., New York 3, N. Y. Pp. 372. Price $29.40.

Sulphur. System No. 9, Section A2 of the 8th Edition of GMELIN'S Handbook of Inorganic Chemistry. This edition, published in German, is an unusually complete review of modern scientific literature on the occurrence and technology of sulphur and sulphur compounds, of the colloidal chemistry of sulphur, and of the physiological phenomena caused by sulphur. First sections of the volume cover the geochemistry of sulphur. The section on the technology of sulphur describes methods of extracting sulphur from ores, followed by an exhaustive review of the derivation of elemental sulphur, hydrogen sulphide, and sulphur dioxide. Published by Verlag Chemie, GmbH, Weinheim/Bergstrasse, West Germany. Available in the U.S.A. through Walter J. Johnson, Inc., 125 E. 23 St., New York 10, N. Y.; and Stechert-Hafner, Inc., 31 E. 10 St., New York 3, N. Y. Pp. 450. Price $35.30.

Annual Report of the Geological Survey for the Year 1950, Sierra Leone. To be purchased from the CMS Bookshop, Oxford Street, Freetown, and from the Crown Agents for the Colonies, 4 Millbank, London, S. W. 1. Pp. 13. Price 1s.

A Review of the Broken Hill Lead-Silver-Zinc Industry. By O. H. Woodward. Containing the significant historical, technical and industrial details of the industry. Revised by the author from an address in 1940. Indexed. Pp. 391 plus maps, plates and graphs. Published by the Australasian Institute of Mining and Metallurgy, Inc., 1952.

Canadian Trade Index, 1953. Published by the Canadian Manufacturers' Association, Inc., Toronto, Can. Revised and expanded issue of the index, containing alphabetical and classified directory sections, the foreign trade section and advertisements. Pp. 1125. Price $7.50.

The following reports may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at the prices specified:

U. S. Geological Survey Professional Paper 247. Pegmatite Investigations 1942-1945, Black Hills, South Dakota. By Lincoln R. Page and others. Descriptions, maps, and diagrams of deposits of mica beryl, lithium, tantalum, tin, and feldspar. Pp. 228 plus 45 maps. Price $3.50.

U. S. Geological Survey Bulletin Paper 238. Geography, Geology, and Mineral Resources of the Ammon and Paradise Valley Quadrangles, Idaho. By George R. Mansfield. This report is a supplement to earlier studies. Details on phosphate deposits estimated to contain substantial tonnages are included. Pp. 92 plus maps. Price $2.00.

U. S. Geological Survey Professional Paper 251. Geology and Mineral Deposits of Jumbo Basin, Southeastern Alaska. By George C. Kennedy. A discussion of the contact metamorphism, geomagnetic surveys, magnetite deposits, and iron ore reserves of part of Prince of Wales Island. Pp. 46 plus 48 maps and illustrations. Price not specified.

U. S. Geological Survey Professional 989-B. Gypsum Deposits near Iyoukeen Cove Chichagof Island.. Southeastern Alaska. By G. M. Flint Jr. and E. H. Cobb. Pp. 12 plus map. Price 30¢.

U. S. Geological Survey Bulletin 982-F. Magnetite Deposits of the Sterling Lake, N. Y.-Ringwood, N. J., Area. By Preston E. Hotz. Pp. 90 plus maps. Price $1.25.

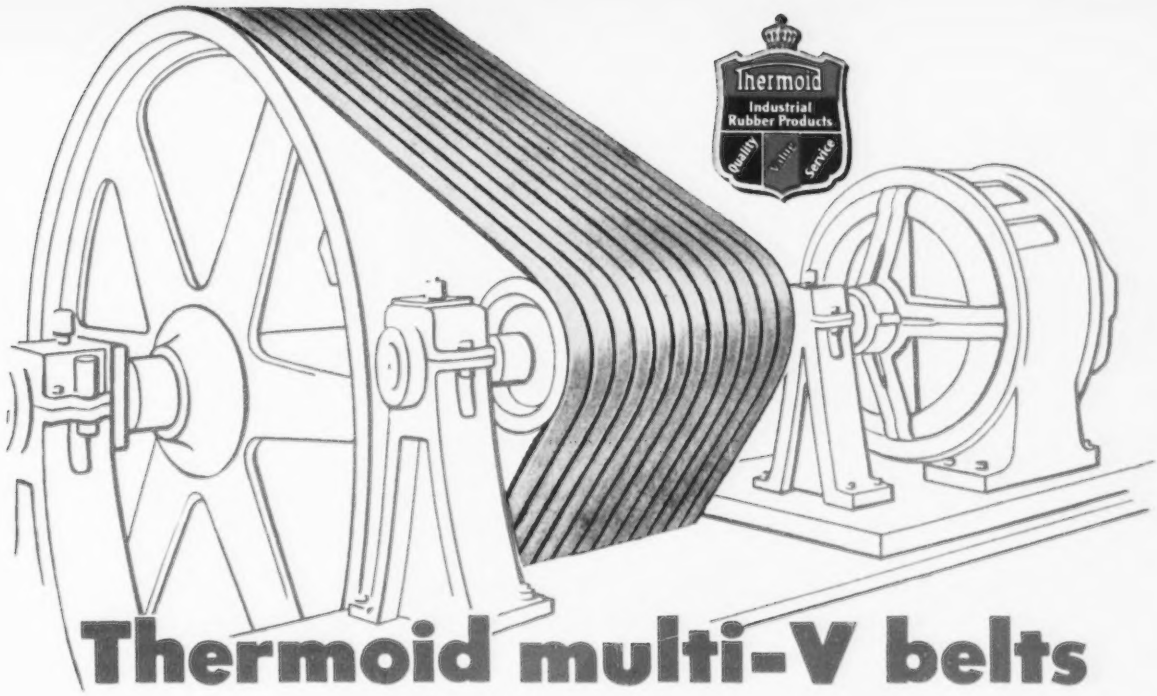
U. S. Geological Survey Bulletin 988-F. Uranium-Bearing Deposits West of Clancey Jefferson County, Montana. By Wayne Roberts and Arthur Gude III. Nine uranium deposits occupy in a small area west of Clancey, Montana. According to this report, Newmont Mining Corp. has leased the properties containing uranium deposits and has begun development on one of the deposits. Pp. 18 plus maps. Price not specified.

Geological Survey Bulletin 998-A. Zinc-Copper Deposits at Tracy Arm, Petersburg District, Alaska. By H. R. Gault and R. E. Fellows. Pp. 15 plus maps. Price 35¢.

U. S. Geological Survey Bulletin 1002-A. Geophysical Abstracts 152, January-March, 1953. By Mary C. Rabbitt, S. T. Vesselowsky, and others. Pp. 61. Price 25¢ single copy; $1 per year, 35¢ additional for foreign mailing.

U. S. Geological Survey Bulletin 993. Refractory Clay Deposits of South-Central Colorado. By Karl M. Wagge. Pp. 104 plus maps. Price not specified.

History of Fifty Years of Mining at Tonopah, 1900-1950. By Jay A. Carpenter, Russell R. Elliott and Byrd Fanita Wall Sawyer. Published by



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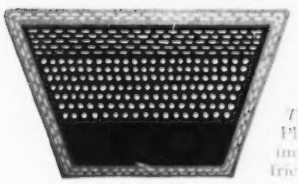

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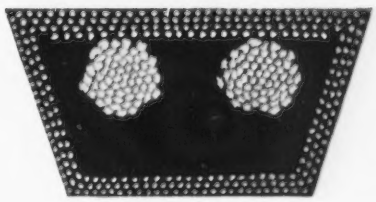

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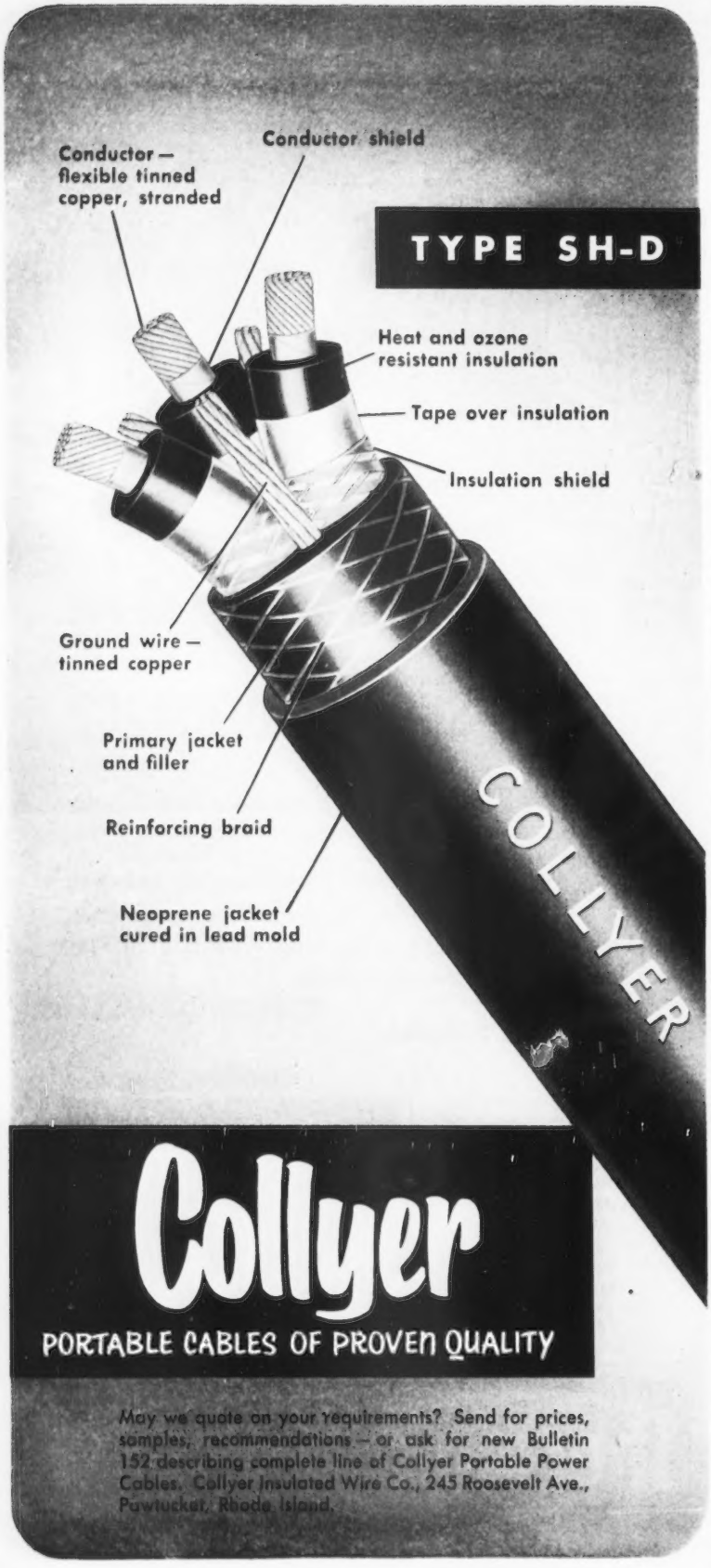

New Books *(Continued)*

the U. of Nevada. Price $1.00 at State Printing Office, Carson City, Nev.

The Geology and Ore Deposits of the Seafoam Mining District, Custer County, Idaho. By Samuel B. Treves and John D. Melear. Idaho Bureau of Mines and Geology, Moscow, Idaho. Pamphlet No. 96.

History of the Early Reduction Plants of Butte, Montana. By Ralph I. Smith. May, 1953, Montana School of Mines, Butte, Mont.

Geology and Mineral Deposits of the Zosell (Emery) Mining District, Powell County, Mont. By Forbes Robertson. Memoir No. 34, Montana School of Mines, Butte, Mont.

The following reports may be obtained from the State of California, Department of Natural Resources, Ferry Building, San Francisco, Calif., at prices specified:

Geological Investigations of Strontium Deposits in Southern California. Special Report 32, 1953, by Cordell Durrell. 48 pp., plates, figures. Price $1.25.

Flotative Properties of Titanium Minerals in Oleate Solutions; Mines and Mineral Resources in Kings County, Calif.; and Adsorbent Clays in Calif. California Journal of Mines and Geology, Vol. 49, No. 3, July, 1953.

The following reports and bulletins are available at the agencies of the U. S. Government noted at prices specified:

An Occurence of Autunite, Lawrence County, S. D. By R. C. Vickers. Geological Survey Circular 286. Free on application to the Geological Survey, Washington 25, D. C.

Preliminary Report on Uuranium Deposits in the Miller Hill Area, Carbon County, Wyo. By J. D. Love. Geological Survey Circular 278. Free on application to the Geological Survey.

A Preliminary Determination of the Age of Some Uranium Ores of the Colorado Plateau by the Lead-Uranium Method. By L. R. Stieff, T. W. Stern and R. G. Milkey. Geological Survey 271. Free on application to the Geological Survey.

Contributions to Geochemistry, 1949. By W. W. Brannock and others. Geological Survey Bulletin 992. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 65¢.

Geochemical Prospecting Abstracts Through June, 1952. By John W. Harbaugh. Geological Survey Bulletin 1000-A. Abstracts of world literature on geochemical prospecting methods. U. S. Government Printing Office, Washington 25, D. C. Price 20¢.

(Continued on page 200)

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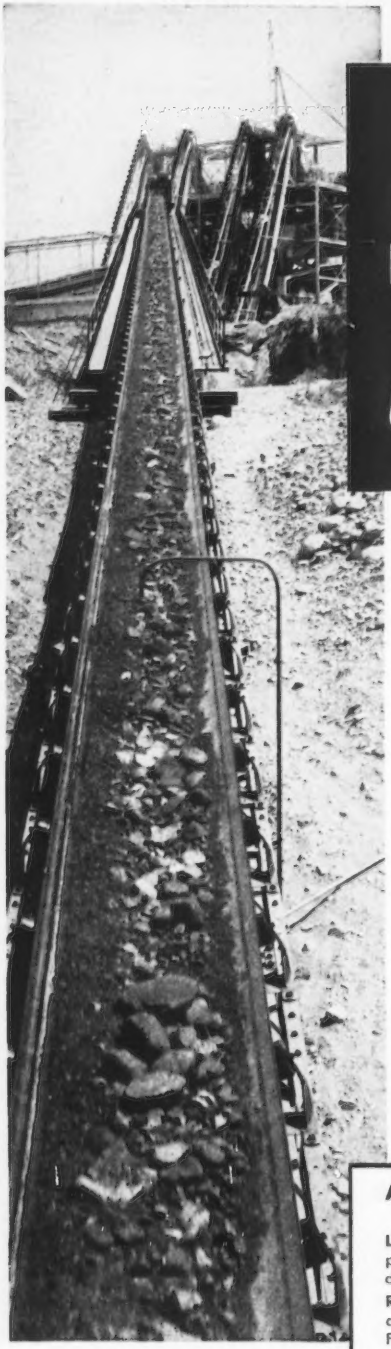

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The following publications may be obtained from the U. S. Bureau of Mines Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa.:

R. I. 4989. Investigation of the Sunset Copper Mine, Snohomish County, Wash. By Peter H. Toepfer.

R. I. 4973. Investigation of the Boulder County Tungsten District, Boulder County, Colo. By J. D. Warne and F. D. Everett.

R. I. 4976. Investigation of Alabama Manganese Deposits, Calhoun, Cherokee and Cleburne Counties, Ala. By C. E. Wyndham.

R. I. 4988. The Future of Birmingham Red Iron Ore, Jefferson County, Ala. Part I, History and Ore Reserves. By J. R. Thoenen and Avery H. Reed, Jr.; **Part II, Concentration.** By B. H. Clemmons.

R.I. 4977. Tests of a Heat Pump for Domestic Heating and Cooling. By E. P. Carman. This report includes detailed information about a 6-year trial run with a heat pump in a Virginia home. The unit was used for heating and cooling, Pp. 31.

R.I. 4986. Investigation of the Copper Bullion Claims, Rua Cove, Knight Island, Alaska. By F. A. Rutledge. Pp. 6 plus illustrations.

R.I. 4984. Concentration of Klukwan, Alaska, Magnetite Ore. By R. R. Wells and R. L. Thorne. Pp. 15 plus illustrations.

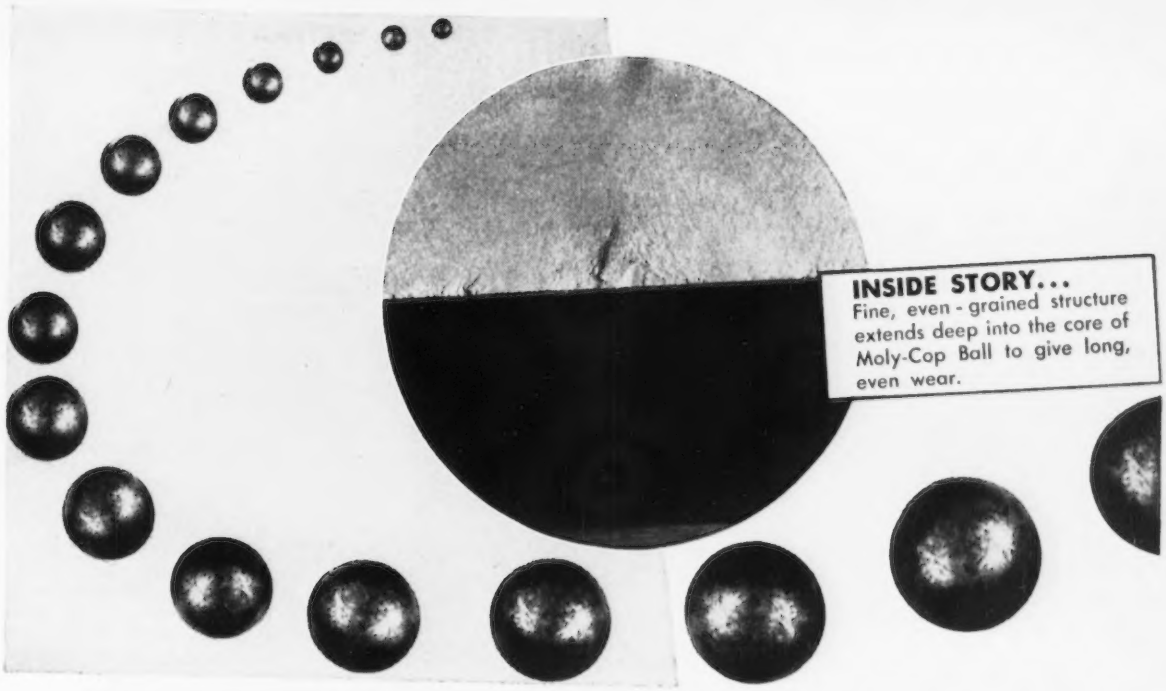
R.I. 4990. A Colorimetric Method for Determining Pine Oil in Water. By J. A. Sutton. Pp. 15.

R.I. 4985. Concentration Tests of Manganese Ores. By A. L. Engel. Reports on gravity and flotation tests performed on manganese ores from California, Nevada, and Mexico are included in this bulletin. Pp. 14.

R.I. 4981. Investigation of Red Iron Ore, Woodstock and Bucksville Areas, Alabama. By Avery H. Reed, Jr. Pp. 34 plus illustrations.

R.I. 4980. Mine-Timber Preservation by the Collar Method. Progress Report No. 1. By Edward Roberts. "Timber preservation while the tree is still on the stump" might be a good sub-title for this report which described a unique process of injecting timber preservatives in a live tree before cutting it for timber. This technique takes advantage of a tree's circulatory system to distribute "dope." The Bureau reports that this method may prove a boon to small mining operations. Pp. 14 plus illustrations.

Pegmatite Deposits of the White Pichacho District, Maricopa and Yavapai Counties, Arizona. By Richard H. Jahns. Published by U. of Arizona, Tucson. Bulletin No. 162. Price $1.25, free to residents of Arizona.



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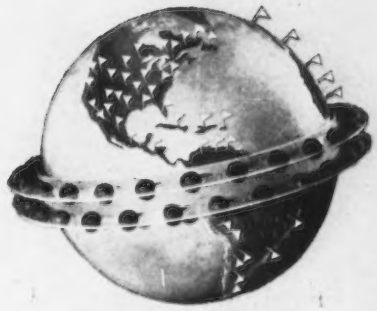

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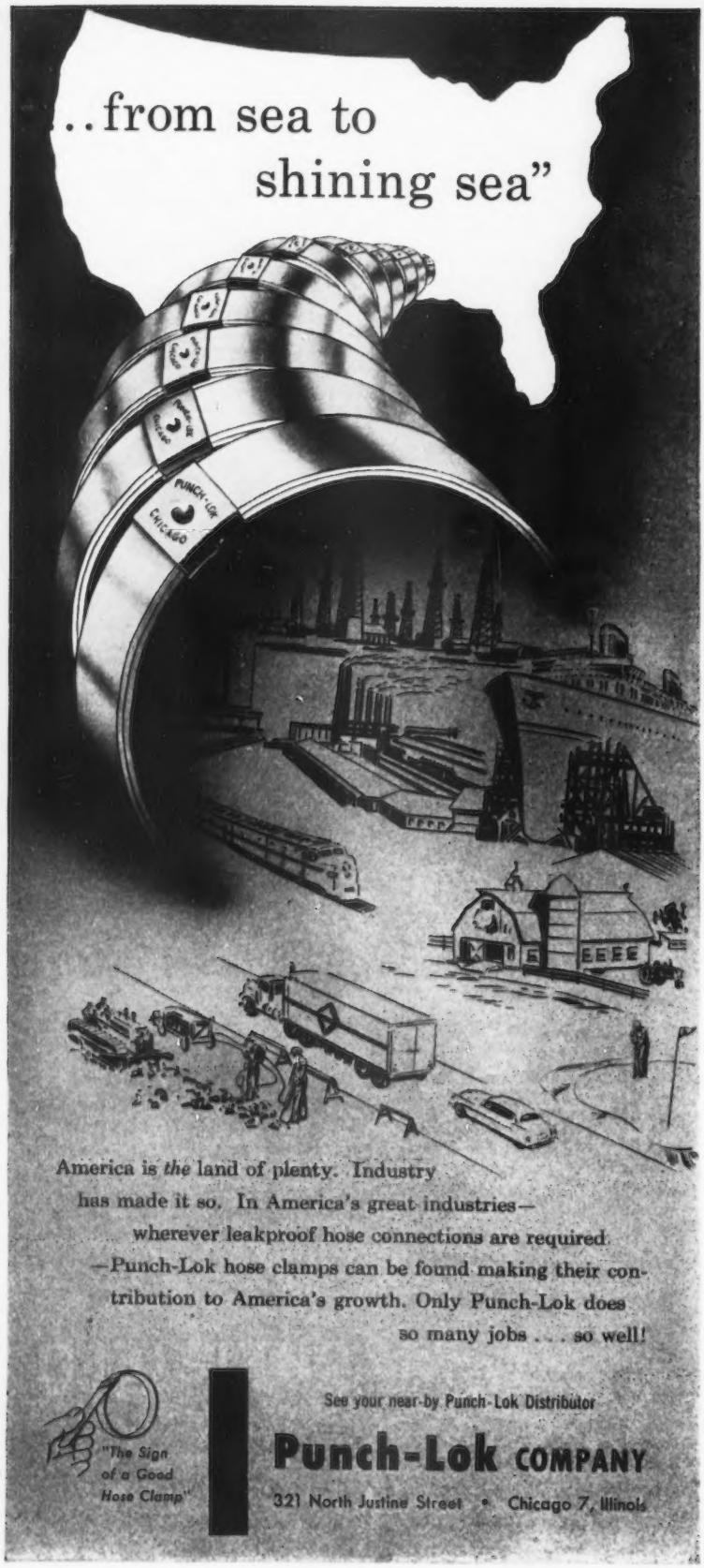
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LETTERS TO THE EDITOR

(Continued from page 4)

I might add that I have come to hold in very high regard the many men within the Bureau of Mines who have devoted practically their entire working lives to the public service. I assure you that the incumbents of the positions in question will be retained in their present capacities as long as they measure up to the responsibilities of the positions.

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Assistant Secretary of the Interior
Dept. of the Interior.
Washington 25, D. C.

For The Ore-Hunter

SIR:

The already expanded Forest Service, with an insatiable appetite for more land to place under its control, now under the Hope Bill (H. R. 5358) will further inject its tentacles to (eliminate) the opportunity for a prospector to even go on Forest Land, much less endeavor to develop a valid claim to mineral. (It has) gone far beyond the original intention for the public benefit.

I complain that the prospector, the hunter of mineral on the public domain, is being restricted in the legal pursuit of his . . . imagination.

L. M. RICHARD
Rome, Ga.

Hamstringing Engineers

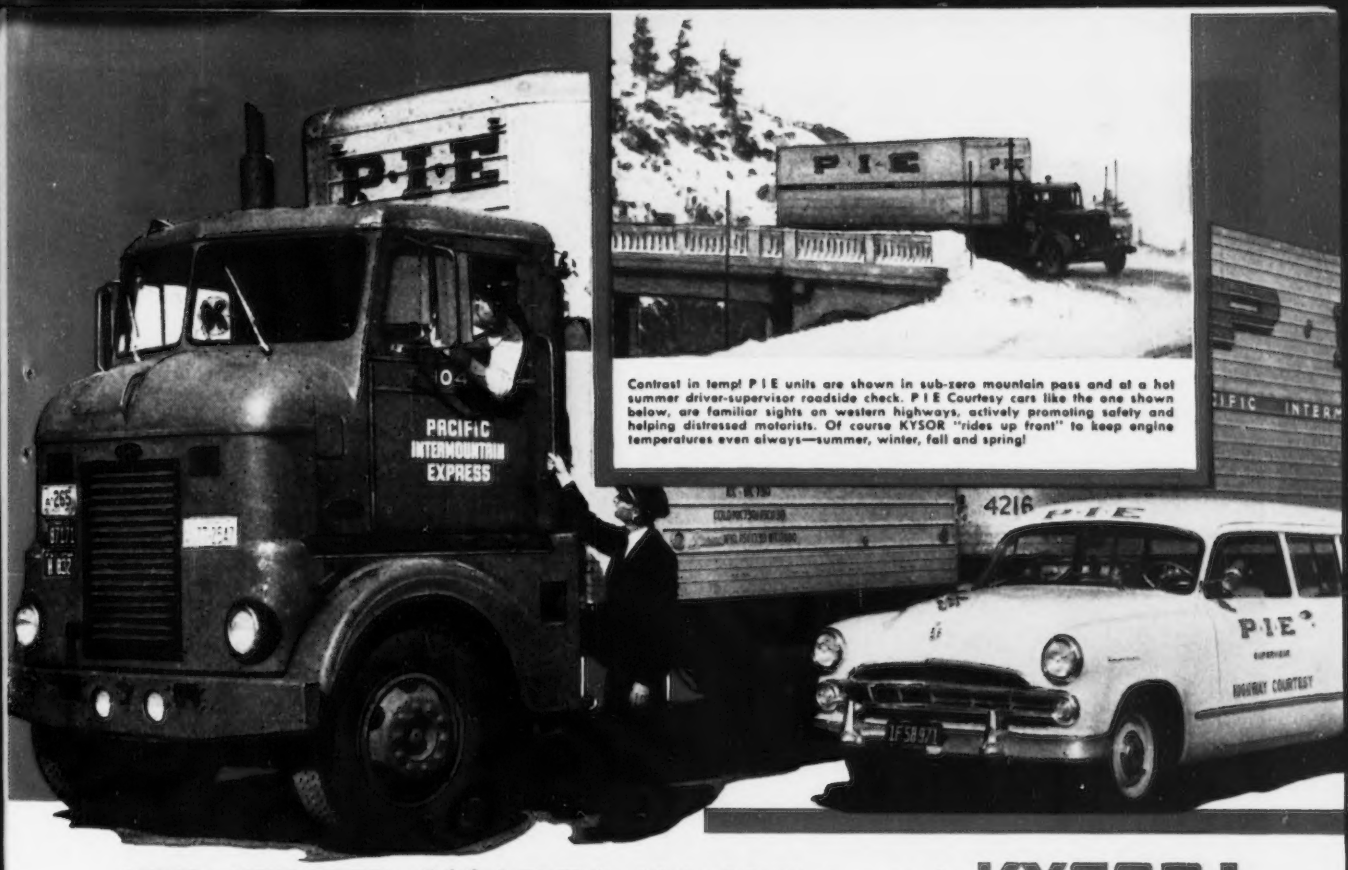
SIR:

A situation has arisen in the United Nations which is definitely prejudicial, not only to U.S. interests, but also to U.S. mining engineers.

Recently, a friend of mine, Blanford C. Burgess, a U.S. engineer whom I have known for many years, returned from Johannesburg, S.A. (office of DMPA, where he has been serving). Since the Johannesburg office was being closed, Mr. Burgess wrote to Donald B. Kennedy, Technical Assistance Recruitment Office of the United Nations, inquiring as to a possible connection with that organization.

Mr. Kennedy replied as follows:

"I would be very pleased to consider you for a number of assignments but, unfortunately, we are at this time encountering serious difficulty in the employment of U.S. citizens for any of our posts for which we have an urgent deadline. As you probably know, we are now required to furnish the U.S. Government with certain information about experts we are considering for assignments under the Technical Assistance programme. As we have found that considerable delay is involved in the processing of this information, we have been forced to withdraw consideration of many U.S. citizens for



Contrast in temp! P I E units are shown in sub-zero mountain pass and at a hot summer driver-supervisor roadside check. P I E Courtesy cars like the one shown below, are familiar sights on western highways, actively promoting safety and helping distressed motorists. Of course KYSOR "rides up front" to keep engine temperatures even always—summer, winter, fall and spring!

P·I·E SHARES HONORS *with* KYSOR!

Winner of the Transport Topics Truck Shop Excellence Contest in the 700 trucks and over class, P I E graciously credits Kysor Automatic Radiator Shutters as helping greatly in achieving this honor. Kysor acknowledges with thanks!

"Our tractors are subjected to a wide range of conditions and temperatures from Wyoming through California with 100° temperatures to sub-zero temperatures, and the Kysor shutters have held even engine operating temperatures through it all.

'Even engine operating temperatures, made possible by the Kysor shutters, have increased fuel and oil mileages and have been a contributing factor in increasing engine life to 180,000 miles between overhauls."

Signed: Jack W. Riesing.

Jack W. Riesing

DIRECTOR OF FLEET MAINTENANCE PACIFIC INTERMOUNTAIN EXPRESS CO.

Why should we say more?

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Automatic SHUTTERS

"Wherever Engines Work"

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Bethlehem Wedge*
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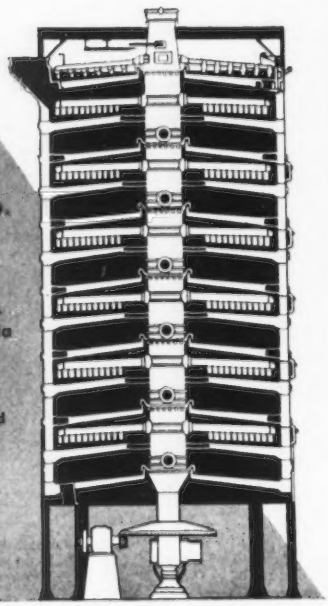
* Reg. U. S. Pat. Off.

Nichols-Wedge multiple hearth roasters, with SO_2 gases downdrafted to increase sulphation, are efficiently sulphatizing copper, nickel and cobalt ores. One recent example is an installation of six 8 hearth roasters which are sulphatizing cobalt to make it water soluble, thereby effecting separation from the acid soluble oxide.

For sulphate roasting or other thermal processing requirements (equipment or engineering) the Nichols organization is at your service.



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40 S. Los Robles Ave., Pasadena 1, Calif.
1477 Sherbrooke St. W., Montreal 25, Canada

representatives:
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114, Cromwell Road, London, S. W. 7, England
SOCIETE GENERALE DES MINERAIS
21, Rue du Marais, Bruxelles, Belgium

Letters *(Continued)*

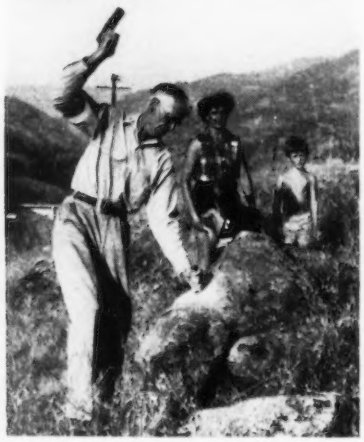
posts which need to be filled during the summer and fall of this year."

I am told that the U.S. pays about two-thirds of the expenses of the UN, yet our own government creates so many obstacles that by the time a U.S. engineer hurdles these, the position for which he has applied is filled by a foreign (engineer) who has none of these difficulties to contend with. All of this, I presume, is to prevent American Communists from securing positions with the UN, but how do we know that the foreigners, who are not required to take any tests, are not Communists?

One danger in debarring U.S. engineers from filling these positions is that if uranium, or any other strategic mineral, is found in certain areas by a foreign engineer, there is always a possibility that it would be reported first to a foreign government which might be able to negotiate for the ore before the U.S. learned of it.

The bill which makes it unlawful for U.S. citizens to accept employment with the UN until their applications for employment have been approved by the Attorney General passed the Senate (73-0) and is awaiting House action. Not only should this legislation be modified but processing of U.S. engineers should be speeded up so that they will have an equal chance at . . . engineering positions.

CHARLES A. MITKE
New York City



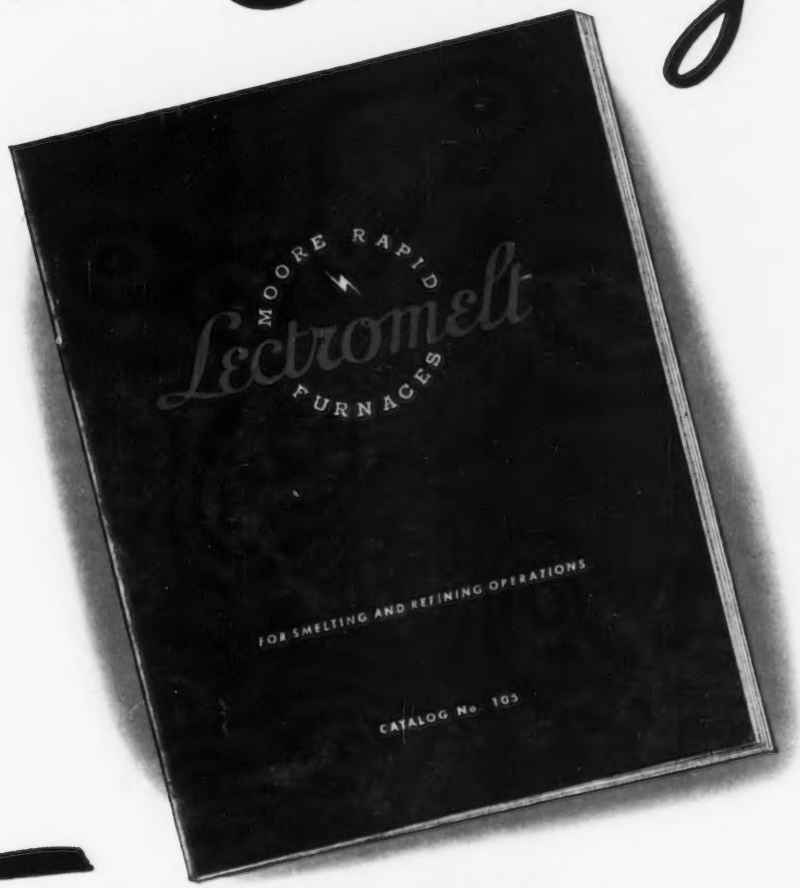
Man With Hammer

SIR:

Up in the High Sierras for ten days, . . . (we took some) pictures. I am sending (the shot) I liked best . . . white hair, spectacles and thirty pounds lighter than on the day when I got first money at the Railroad Day celebration at Tonopah in 1904.

I don't remember having hit a drill in 15 or 20 years and I will say that the first few blows I was not any too sure of myself, but after I had come

New Catalog



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*REG. T. M. U. S. PAT. OFF.

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Letters *(Continued)*

down on it for a half-minute or so the old confidence returned and I'm conceited enough to believe that I was hitting that drill about as hard as I ever did, but not very fast. It is the hammer that Yockey gave me.

The woman in the picture is my daughter-in-law and the young fellow without the shirt, my grandson.

ATHA ALBERT RICHIE
Rialto, Calif.

Ed.: Mr. Richie, one of E&MJ's favorite authors, swings the hammer given him by the famous Fred Yockey, champion single hand driller mentioned in "The Real Facts About Those Famous Old Hand-Drilling Contests" (E&MJ, Nov., 1951), written by Mr. Richie. It is believed the hammers were custom made for the champion.

Two-Bits On Copperhill

SIR:

The article which appeared in the June, 1953 issue of *E&MJ*, under the title "The Remarkable Case of the Copper Hill Ball Mill," is most challenging. I should like to contribute my two-bits of discussion.

. . . Explanation for the improved performance of the mill in switching from a 45% ball load to a 29% ball load, is to be found in the substantially larger tonnage of ore in the mill, and in turn the higher ratio of ore to balls, in the ball mass, under the condition of the smaller ball load. A few assumptions and rough calculations will show that there is 2.95 tons more ore in the 29% mill than in the 45, and that the ratio of solids to balls is .20 for the 45% mill and .40 for the 29% mill.

Here are the calculations:

The volume of the mill is:

$$59 \times \frac{100}{45} \times 2000 \div 300 * = 806 \text{ cu. ft.}$$

*(One cu. ft. of balls weighs 300 lb.)

Assuming that 50% of the volume of the mill is occupied by balls and pulp (.50 − .45 = .05) the volume of pulp in the 45% mill is:

$$(811 \times .45 \times .40) + (811 \times .05) = 187 \text{ cu. ft.}$$

and for the 29% ball-load mill, assuming 40% voids in the ball mass:

$$(811 \times .29 \times .40) + (811 \times [.50 - .29]) = 265 \text{ cu. ft.}$$

The difference in the volume of pulp in the two mills is:

$$265 - 187 = 78 \text{ cu. ft.}$$

The density of the pulp in the mill is:

$$D = \frac{1}{\frac{.63}{4.6} + \frac{.37}{1}} = 1.92$$

The weight of a cu. ft. of pulp is:

$$62.5 \times 1.92 = 120 \text{ lb.}$$

And by the article the weight of solids in the cu. ft. is:

$$120 \times 63 = 75.6$$

There is, therefore, 2.95 (78 X 75.6

Lead-Zinc Mining in Utah—Bethlehem Hollow teams up with carbide-tipped bits on the 1500-ft level of the Mayflower Mine of New Park Mining Co. This jumbo-mounted drifter puts in 6-ft holes through abrasive sulphide ore bodies.

Dam Building in Northwest — Excavating work at the site of Chief Joseph Dam on the Columbia River called for more than 100 tons of Bethlehem Hollow. This is a recent addition to the long list of big projects where this "old reliable" of drill steels has had the responsibility for keeping drilling on schedule.

Buffalo Underpass Job — Rock drilling doesn't stop for chilly weather in Buffalo. Here Bethlehem Hollow bores into hard, flint-streaked rock on an excavating job that removed 70,000 cu yd of rock on a four-lane underpass contract.

Steel that chews rock from Vermont to California

Deep-holes, short-holes. Hard, abrasive ore . . . basalt . . . dolomite. Steel bits . . . bits with carbide inserts.

Whatever the depth of hole, type of rock, or style of detachable bit, there's one hollow drill steel that does the job from coast to coast, and does it well. It's Bethlehem Hollow.

Make sure you've got this old reliable on the job!

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Bethlehem Hollow Drill Steel is ready to ship from our mill depot in all popular sections and sizes. Also available from local converters. And if you need solid drill steel, quarrying steels, auger drill steel, or steel for stone-dressing tools . . . remember to specify Bethlehem. Each steel is engineered to give a lot of service.

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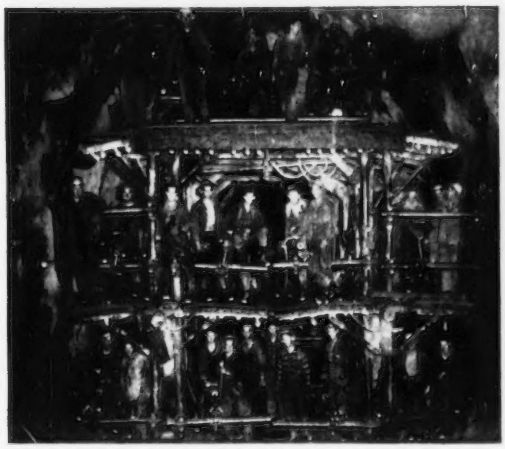
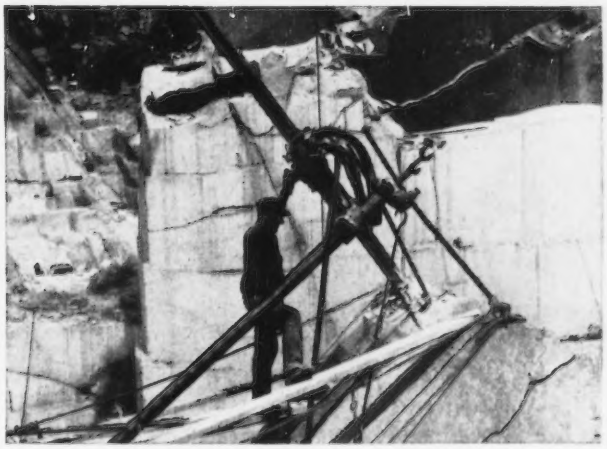
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



California Tunnel Project—Here's the three-story drill carriage and one of the crews that smashed three records for driving large-diameter tunnels. Big Creek Project No. 4 was the scene of this outstanding performance of Bethlehem Hollow.



Quarrying Vermont Granite—A real test of drill-steel quality is provided by "Rock of Ages," a hard, dense-grained granite. This rock drill, using Bethlehem Hollow, is mounted on a movable saddle so that a line of holes can be drilled in perfect alignment. Quarries everywhere rely on Bethlehem Hollow.

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Letters *(Continued)*

÷ 2000) tons more pulp in the 29% ball mill at any instance than in the 45% mill.

Since the pool is larger in the 29% mill than in the 45% mill, it is reasonable to assume that the settlement of solids will be greater in the 29% mill than in the 45% mill in proportion to the larger solids in the mill.

The mill is operating more efficiently at the 29% ball load for the same reason that a rolls crushes, or a stamp crushes more efficiently when choke fed. The hp. per ton of finished product should be, and is, less; the ball consumption should be, and is, less; and the softer sulphides should be. and are, a little more finely ground under the condition of the 29% ball load.

The lesser reagent taken on the product from the 29% mill, with better recovery, is accounted for on the theory that a lesser surface concentration of collector molecules is required to lift the finer particles. I should like to think that the Hydroscillator classifier in this circuit is responsible for the improvement resulting from the change in ball load—since I am the inventor of that machine—but I do not.

A. W. FAHRENWALD
Dean, School of Mines, University of Idaho

Lay That Ruler Down

SIR:

A rap on the knuckles for you in printing Dr. Scharen's claim that one pound of magnesium will deliver as much power as 10 gallons of gasoline. (*E&MJ* Outlook, Sept.) without first taking a quick peek in your handbook. This simple precaution would have informed you that the heat of combustion of gasoline is nearly twice that of magnesium, per unit weight. As fuel, the gasoline equivalent of one pound of magnesium is more like a half pint than 10 gal. If Dr. Scharen has found a way to beat this he deserves a full article instead of two lines. I do not think he has.

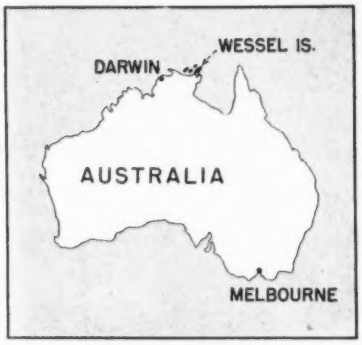
Tsk, Tsk.

JOHN M. MCKEE
Nuclear Development Associates, White Plains, N. Y.

Ed.: Sorry, but you'll have to lay that ruler down. We have checked with Dr. Joseph Scharen, and find that his statement stands. He insists that one pound of a new fuel, consisting chiefly of powdered magnesium, can develop as much power as 10 gal. of gasoline. It has already been used successfully to run a steam engine (as has a coal and powdered aluminum fuel). Automobiles with specially designed engines could also use this fuel.

Development of the fuel is beyond the embryonic stage, but the Reade Manufacturing Co., does not wish to release any additional information at this time.

Handbook data on heat of combustion cannot be used in comparing the energy in equivalent amounts of magnesium fuel and gasoline, unless the chemical reactions involved in the combustion of the new fuel are known—and this information is not available.



Where's Machimbar?

SIR:

There was a reference on Page 182 of your Sept. issue regarding bauxite deposits on Machimbar Island. I wonder if you would be kind enough to give a more specific location for the Island.

JAMES BOYD,
Exploration Manager, Kennecott Copper Co.

Ed.: Machimbar Island is the northernmost island of the Wessel Island group which lies slightly northwest of Australia's Gulf of Carpentaria (see map). Machimbar Island is 27 mi. long, 3-7 mi. wide. South Gippsland, mentioned in the news item also, is southeast of Melbourne. For additional news of Machimbar Island, see page 174.

Vermont Free Enterprise

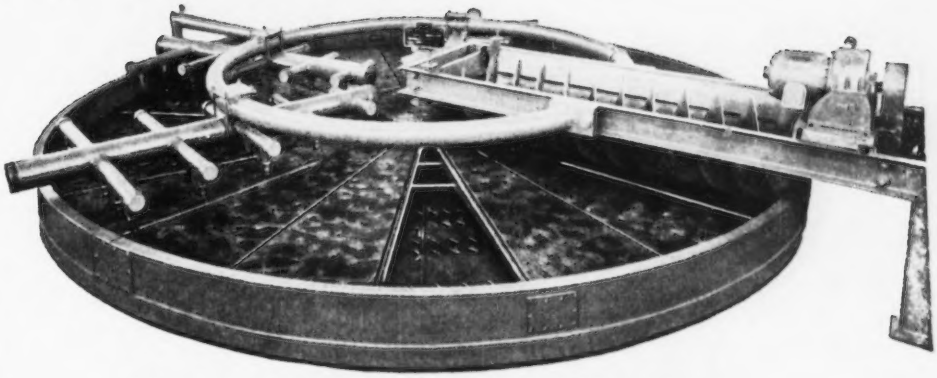
SIR:

Concerning your feature article in the Oct. issue of *E&MJ*, the story of our Vermont Copper Co. (The property) has absorbed a tremendous amount of my time and interest since I decided in the early spring of 1942 to open these abandoned and almost forgotten copper mines. I took the matter up only because of the insistence of government officials who portrayed to me the desperate copper situation in this country.

I decided that this was my war work for the second World War and . . . organized the company. Government financing amounted to only $550,000, compared to $1,300,000 of private and it is my understanding that this was the only fully abandoned copper mine in the U.S. which was

S—165

OLIVER



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The important fact to keep in mind is that, including the Horizontal and Dorrco, we have four distinctly different continuous vacuum filters for handling mineral products as well as several pressure type filters from which to select. And, further, in making our recommendations we call upon 45 years filtration experience in the metallic and non-metallic mining industries.

Oliver Horizontal Filter
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*U.S. Patent Nos.
2,588,912
2,588,976

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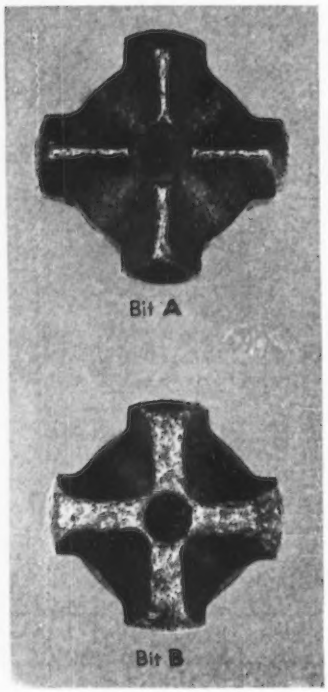

Bit A went five times as far in flint-hard rock as untreated Bit B. What's more, the unretouched photos clearly show that gauge loss has been held to a minimum in Bit A, permitting it to be redressed, retreated and rerun. Untreated Bit B, on the other hand, is completely exhausted.

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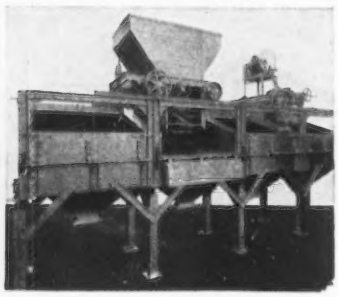

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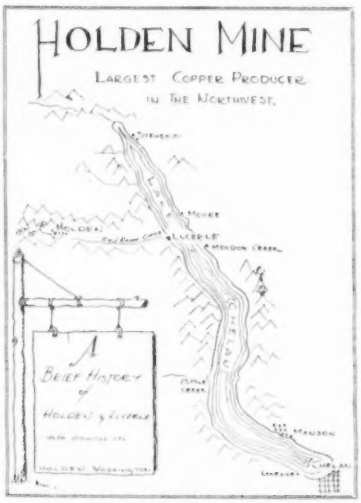
Letters *(Continued)*

opened primarily with private capital. I personally supervised the plant construction in every phase and have directly supervised operations throughout the period.

I am tremendously pleased with the work now being carried on by John F. Cowley, our president.

GEORGE ADAMS ELLIS
Chairman of the Board
Vermont Copper Co.

Ed: The foregoing extracts of Mr. Ellis' letter provide some of the financial history and background of Vermont Copper (E&MJ, Oct., p. 72). The writer has represented several large companies and has spent a great deal of time in the copper industry.



Brogan's Brochure

SIR:

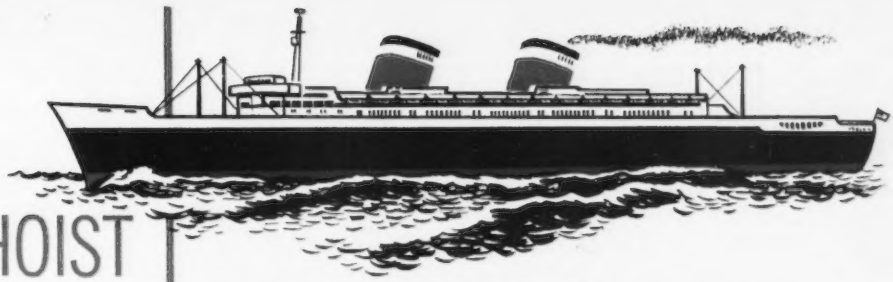
This information booklet is submitted as something mid-way between an operating idea and a good-will developer. Originally, it was conceived as a means of informing tourists.

It developed that the local people were the largest market. Many copies were mailed to friends and relatives . . . teachers purchased copies for use in classes . . . new miners obtained a copy to get a quick picture of method and the location of various levels.

Other organizations might find the idea useful . . . in the direction of acquainting new miners and mill men with operation and layout and facilities offered.

FRANK H. BROGAN
Holden Mine
Holden, Wash.

Ed.: Congratulations, Mr. Brogan, on your fine combination guide and public relations booklet. The booklet, shown in the picture above, contains drawings of the mine and pictures of the mining camp and its facilities.



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Brownhoist Cranes perform equally well as switch engines or cranes operating with magnet, hook or bucket. Monitor Type Cab and Clear-Vision Boom give the operator full 360° visibility. Rugged construction, simplified mechanism, and easy accessibility to all moving parts help keep maintenance and repair costs low. In railroads, steel mills, mines and large manufacturing plants, Brownhoist Cranes are saving production time and money. They are built in capacities from 25 to 80 tons for virtually every materials handling operation. For complete information, consult your nearest Brownhoist representative or write us today.

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BROWNHOIST
builds better cranes

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago; Canadian Brownhoist, Ltd., Montreal • **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles

Braided through and through for longer service, less maintenance!

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On rotating shafts, reciprocating rods or rams, expansion joints and valve stems

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Water, oil, solvents, acids, steam, gases, etc., at temperatures up to 700° F.

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Every strand of LATTICE BRAID packing passes diagonally through the body of the packing to form a completely unified structure—braided internally as well as externally. This patented LATTICE BRAID method has these advantages:

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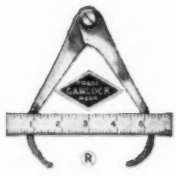
*Registered Trademark



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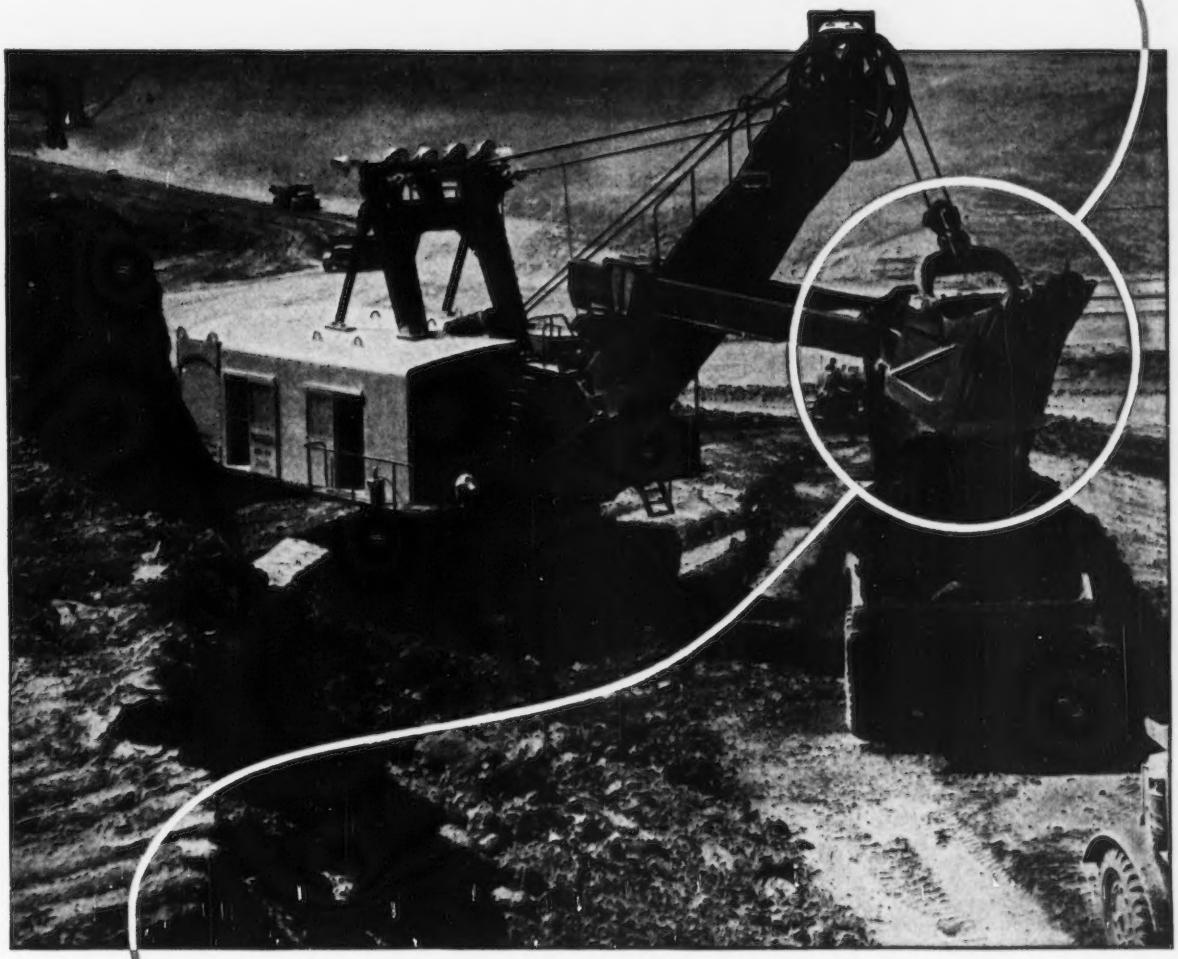

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World's Largest Shovel on Two Crawlers
10 Cubic Yards
with small machine cycle speed and maneuverability
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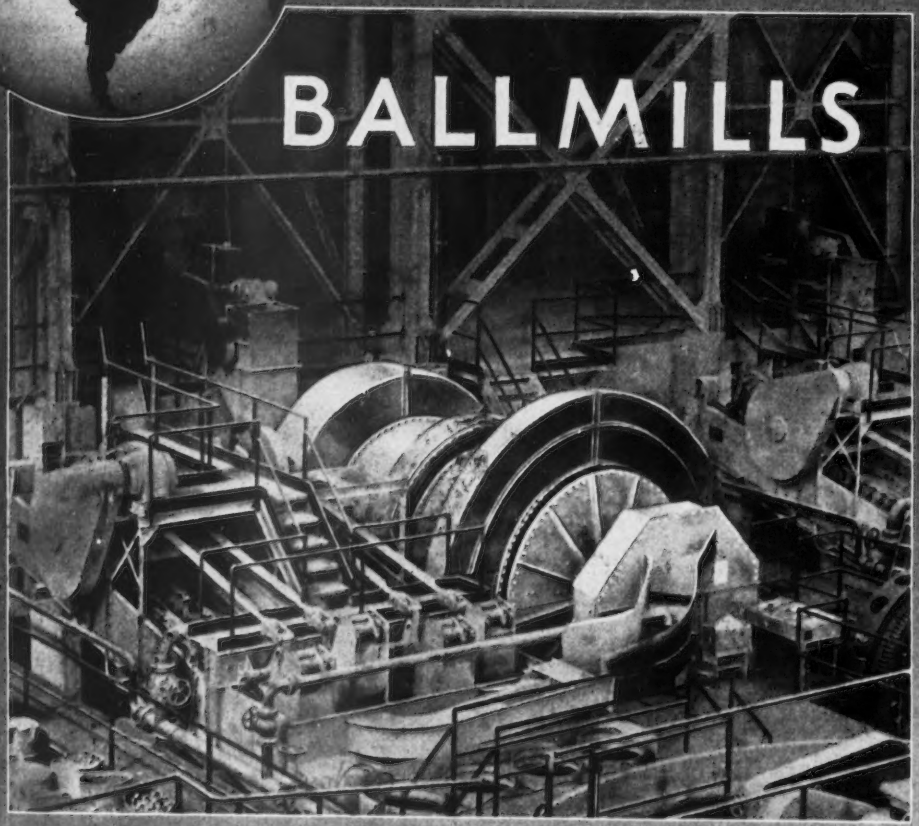

WET OR DRY GRINDING

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ALSO AIR SWEPT FOR GRINDING AND DRYING

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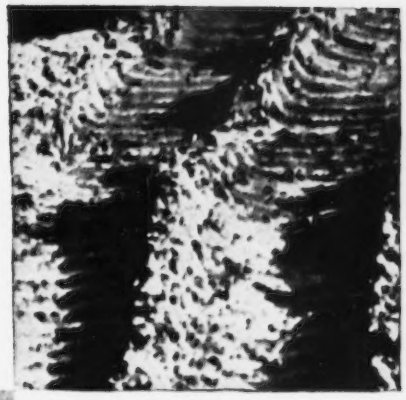
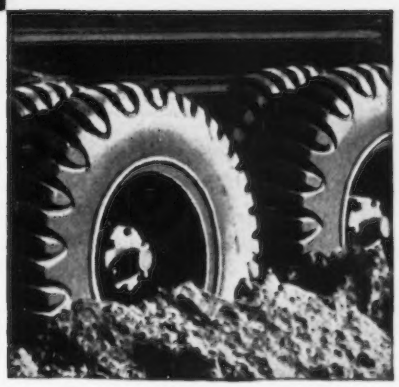
THE TRACK  OF A

Mack TELLS A

STORY OF  Power

Ever notice the ground where a Mack six-wheeled truck has passed over? No scuff marks here. The track of a Mack tells a story of unfaltering traction . . . of surefooted, relentless driving power.

The "reason why" is found in Mack's Balanced Bogie with exclusive inter-axle and inter-wheel Power Dividers that assure positive traction under the most adverse conditions. Acting normally as a true differential, the Power Divider delivers torque between the bogie axles and wheels in proportion to wheel traction, thus eliminating useless wheel slippage and spinning.

Your nearest Mack branch or distributor will show you how Mack six-wheelers can keep your big loads moving fast—no matter how tough the terrain—on dependable, time-saving, cost-cutting schedules.

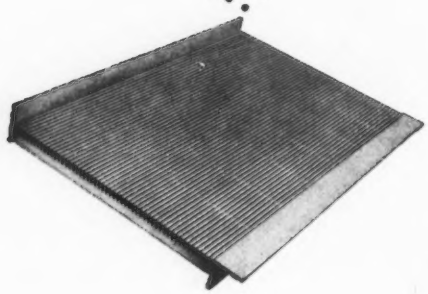
Mack TRUCKS

1726

. . . Outearn Them All

Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

For high recovery content



Hendrick Wedge-Slot Screens have very small openings yet have greater draining and screening capacity. They retain material that would ordinarily be wasted or cause expensive time delays for reprocessing.

Profile bars are shaped to maintain uniform width of slot openings as wear progresses. Long screen service life and constant ore quality are always maintained. Let us know your particular operating methods and we'll be glad to recommend the right Hendrick Wedge-Slot Screen for your specific needs.

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70 DUNDAFF STREET, CARBONDALE, PA. • *Sales Offices in Principal Cities*

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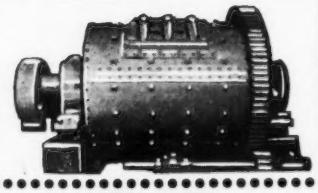
STRAUB

HAS RIB-CONE MILLS FOR ALL GRINDING OPERATIONS

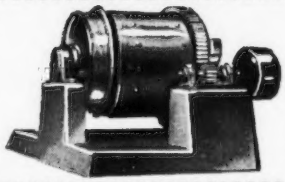
SECTIONALIZED MILL

Completely assembled in our shop, then marked and knocked down for shipping "Anywhere a Mule Can Go."



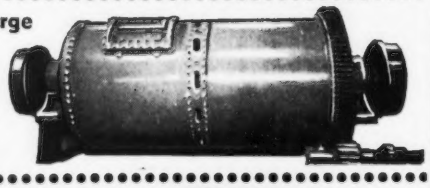
SCREENING MILL

Most economical type. Particularly suited to amalgamating and concentrating classes of ores. Capacity from 2 to 95 tons per 24 hours.



Peripheral Discharge MILL

Particularly suitable for producing a granular product. Designed for controlled grinding of tungsten and similar ores where sliming must be eliminated.



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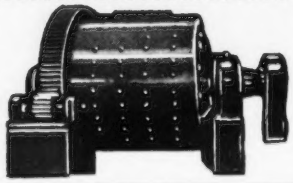
One of the new Champion Series. Available in low pulp line, plain overflow, screening and convertible types with capacities ranging from 25 to 250 tons per 24 hours.



More than 100 sizes and types of ball mills. 40 years of experience in supplying every conceivable grinding requirement is at your disposal in the form of engineering counsel. *An inquiry to our engineering department will bring a prompt reply.*

STRAUB MFG. CO.

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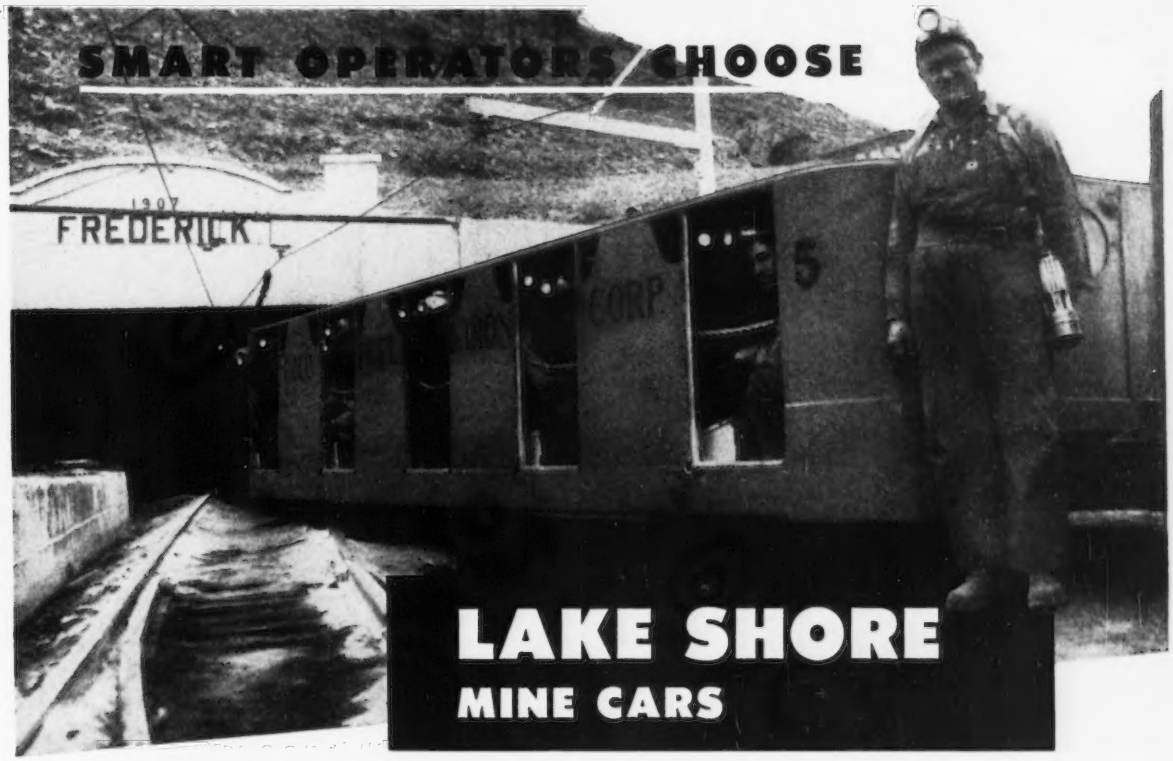
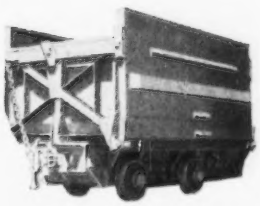
★ More than 100 Sizes and Types of RIB-CONE Ball Mills.



for a safe, smooth ride . . .

THAT'S what this Lake Shore Man Haul car (above) gives 30 men . . . a dry, safe, comfortable, upright ride with plenty of knee and headroom — space on the seats for dinner boxes. Enclosed design gives men full protection. Available insulated against electricity. Car equipped with full universal oscillating trucks, or conventional type.



for heavy loads and rough service . . .

250 cubic feet — the capacity of this tough, all-welded Lake Shore Granby type side dump car . . . designed for the extremely hard loading and operating conditions met in modern, high-production mining.

a standard of reliability . . .

This 38 cubic foot Lake Shore Standard side dump car has given years of trouble-free service in mines all over the country. Time-tested, simple, sturdy design.

Write for more information on Lake Shore "job-proven" Mine Cars and Mine Equipment.

Standard and Special
Mining-Milling Machinery for Every Application.

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MINING OPERATORS USE McCarthy Drills

Heavy-Rugged-Powerful

AT Bessemer Limestone & Cement Co., Bessemer, Pa., one McCarthy unit (above) averages 90 ft. per hour, drilling through hard blue shale and sand rock 34 ft. deep. Blast holes are drilled on 18-ft. centers. Two men handle the whole job, including setup and moving. McCarthy drills operate with gasoline, diesel or electric power units . . . on all types of mounts. McCarthy "money-savers" can work for you. See your nearby distributor or write Salem Tool direct for further information.

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THE SALEM TOOL CO.
803 S. ELLSWORTH AVE.
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This precision meter totalizes the weight of dry material passing over conveyor belts continuously, automatically, accurately. Available as a separate, self-contained unit — or for installation in your present conveyor lines.

EXCLUSIVE FEATURES:

- Accurate . . . within ± ½ of 1% of actual weight from maximum to 50% of rated capacity; within 1% from 50% to 25% rate; within 2% from 25% to 10% of meter's rated capacity.
- Automatic totalizer compensation for variations in belt speed and changes in belt weight.
- Responds accurately to rapid load variations.
- Paces auxiliary equipment (feeders, controllers, continuous blending processes, etc.) and operates secondary instruments.

Write for Bulletin 550-H4, giving complete details. Builders-Providence, Inc. (Division of B-I-F Industries), 391 Harris Ave., Providence 1, R. I.

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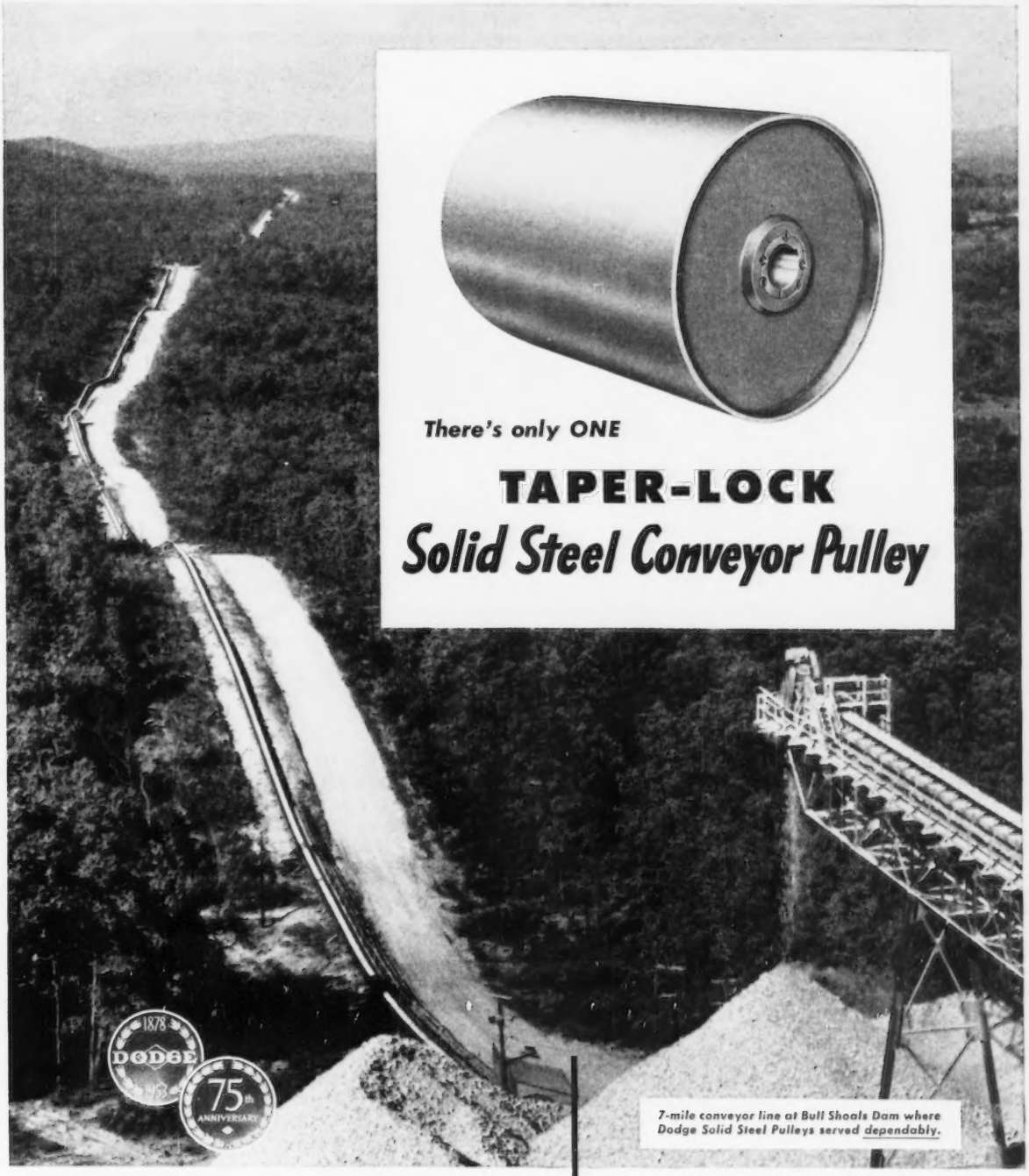

7-mile conveyor line at Bull Shoals Dam where Dodge Solid Steel Pulleys served dependably.

The famous TAPER-LOCK Bushing in the Dodge Solid Steel Conveyor Pulley gives you the equivalent of a shrunk-on fit—and greatly simplifies the job of mounting and de-mounting! The drum type construction of this modern product provides maximum strength with minimum weight. Accurately formed; *uniform* rim thickness. Fully enclosed to exclude dust, dirt, water. Diameters 6 in. to 8 ft., all face widths. Popular sizes stocked by our distributors.

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DODGE

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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you news of cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

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Mines Equipment, Mineral Dressing Plants, Crushing and Grinding Machinery, Cement Mill Outfit, Metallurgical Works, Coal Preparation Plants, Steel Constructions for Buildings and Bridges
Since 1856
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Otto-Gas-, Diesel-Engines for Every Purpose of Two- and Four-Stroke design, Output range 3-1500 H.P. Cooled by water or air, Diesel-powered tractors, Diesel locomotives, Gas producer plants.
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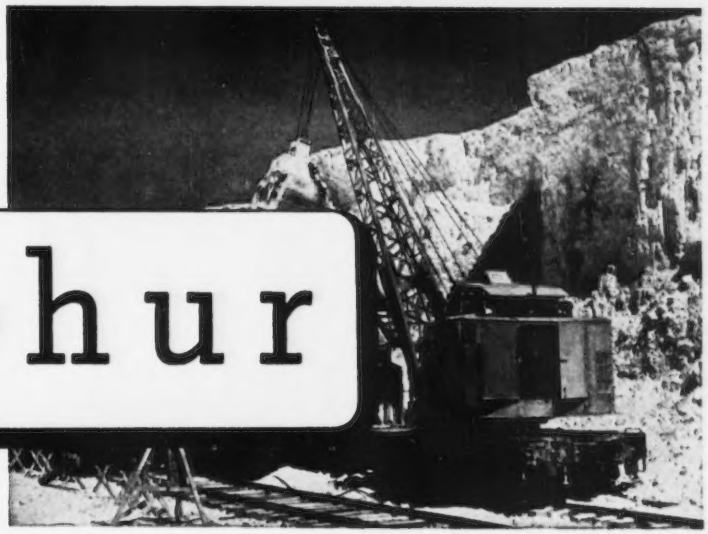
Trucks and busses driven by air-cooled DEUTZ Diesel engines, Vehicles for municipal services, Fire ladders, fire engines, Fire fighting water trucks, Two-wheeled ladders, Fire fighting equipment.
Since 1864
KLÖCKNER-HUMBOLDT-DEUTZ AG · KÖLN U. ULM

Send inquiries to either Köln, Germany or Ulm, Germany



Sulphur

Thousands of tons mined daily, but where does it all go?

Did you ever have the misfortune on a steaming, sticky, sultry day to sit it out on a crowded parkway, bumper to bumper, waiting for traffic to clear? No doubt your thoughts were plenty sulphurous but probably not along the lines we have in mind.

We're thinking of the mineral Sulphur and its link with the automobile. Each car accounts for a substantial poundage of Sulphur, some estimates put it at around 25 pounds for the average car. Give or take 5 pounds, it shows that a tremendous tonnage of Sulphur is needed each year to put cars, buses and trucks on the road ready to operate. And don't forget the tire and battery replacements going on every day.

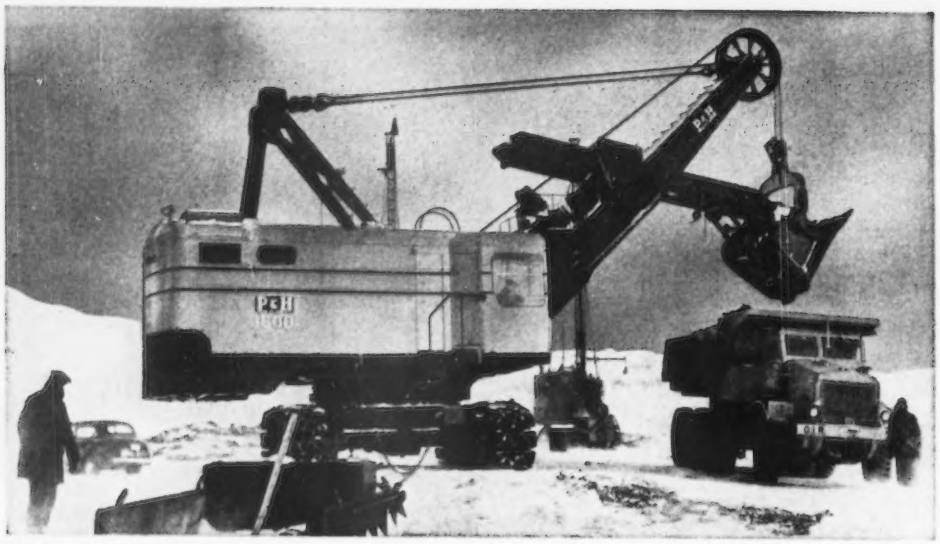
Sulphur enters the automobile picture through the tires, steel sheets, plated and plastic fittings, glass, battery acid and parts, copper tubing and wiring . . . all of which call for the use of Sulphur or its compounds in connection with their manufacture.

Can you wonder that Sulphur goes into industry just about as fast as the sulphur producers of the Gulf Coast Region can get it above ground and cooled preparatory to shipment?

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

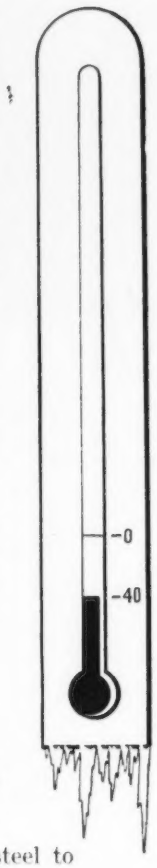
Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas
Spindletop, Texas • Worland, Wyoming



Power Shovel . . . equipped with dipper sticks and other heavily stressed parts fabricated from U.S.S. Tri-Ten, a manganese-nickel-copper steel produced by UNITED STATES STEEL COMPANY.

Characterized by exceptional toughness, Tri-Ten steel withstands repeated shocks, even at sub-zero temperatures. Its fatigue resistance is 50% higher than that of structural carbon steel. Yield point is 50,000 p.s.i., and tensile strength is 70,000 p.s.i., minimum, in ½" thicknesses or under. These values are moderately lower for thicknesses up to 4".

Very good weldability in intermediate and heavier sections makes Tri-Ten steel especially suited for fabricating heavy-duty equipment requiring maximum ruggedness and stamina with minimum weight . . . as demonstrated by this shovel, manufactured by HARNISCHFEGER CORPORATION, Milwaukee, Wisc.



How Nickel helps equipment stay on the job

. . . At 40° Below Zero

Remember when insistent demands for iron ore made it necessary to work Minnesota's Mesabi range in winter?

Power shovel operators ran into plenty of trouble at that time . . . for when they rammed their huge steel dippers into ore frozen solid by sub-zero temperatures, booms and dipper sticks broke all over the range . . .

With one significant exception, however . . .

Shovels equipped with dipper sticks fabricated from U.S.S. Tri-Ten . . . a steel toughened by the addition of nickel and other alloying elements . . . went right on loading the frozen ore. In fact, a leading shovel manufacturer reports that Tri-Ten steel enables his customers to operate equipment in temperatures as low as –45° F.

Extreme cold causes carbon steel to lose some of its toughness, whereas, under identical conditions, steels containing nickel retain a high degree of toughness. In addition to resisting shock, nickel alloyed steels permit cutting bulk and dead weight without sacrificing strength or safety. For example, in some applications the weight of Tri-Ten steel parts was cut 25 percent, despite a 50 percent increase in working stresses.

To assure dependable, trouble-free performance, specify nickel-containing alloys in *your* equipment. We invite inquiries regarding specific applications.

At the present time, nickel is available for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

EMBLEM OF INCO SERVICE

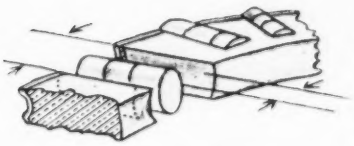
THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Why Rollway's Right-Angle Design increases

BEARING RELIABILITY

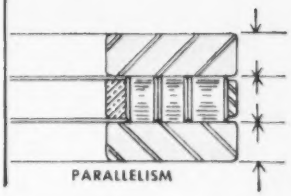
In a Rollway Thrust Bearing the rollers are precision machined to uniform cross-section . . . thrust plates are held to extremely close limits of parallelism. As a result, there's no skewing effect, no wedging of the rollers. Wearback of roller ends is held to a minimum.

That's why, in any given dimensional limit, Rollway Thrust Bearings give you more efficient, heavy-duty service and increased bearing life.



PARALLELISM

Accurate parallelism between the rollers and the matched thrust plates is repeated in the parallelism between the separator slots and the rollers themselves—all adding up to quiet, smooth rolling.



PARALLELISM

Rollway Thrust Bearings offer the widest selection in types and sizes, available for quick replacement through Authorized Distributors. See your classified 'phone directory for name.

Our engineers are available to help you select the correct Rollway Bearing for your needs. No cost or obligation. Contact your nearest Rollway sales office.

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ROLLWAY® BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

A RING OF PRECISION IN EVERY ONE

...A SIZE TO FIT EVERY NEED
...TO MEET SPECIFICATIONS

- Pressure Vessels
- Forgings and Rings
- Hardened and Ground Steel Rolls
- Corrosion and Heat Resisting Castings
- Ordnance and Armor

Measurement is only one type of precision in Midvale rings. The steel for every ring is made by Midvale—physical properties are precisely maintained throughout every step. The shaping and heat treating of Midvale rings are done by "old-hands"—craftsmen with years of experience who precisely machine and test with the most modern metal working and scientific equipment.

Result—rings precision-made in every detail . . . rings that stand the severest abrasive, crushing and grinding action called for by industry.

Whatever your needs for heavy equipment in industry Midvale can assure you of precision and performance. Whether it is roll shells for the mining and cement industry . . . pressure vessels for the chemical and petroleum industries . . . rolls for the paper industry . . . rings for turbines and gears . . . or castings and forgings for any industry . . . Midvale can make them to your most exacting specifications.

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MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Lower End "C"
Lower End "B"
Lower End "A"
Longyear
"L" SERIES DOUBLE TUBE
CORE BARRELS
... with interchangeable lower ends
BALL BEARING SWIVEL TYPE
ROLLER BEARING SWIVEL TYPE
OR RIGID TYPE
DOUBLE TUBE
CORE BARREL
The Choice of Operators for Dependability and Economy
... Cores Tell The Story
LOWER END "A"
INTERCHANGEABLE
FOR SOLID FORMATIONS
Consists of a split ring core lifter and case, an inner tube extension, and a bit. It is especially adaptable for use with the swivel type core barrel heads in reasonably solid formations.
LOWER END "B"
INTERCHANGEABLE
FOR BROKEN FORMATIONS
This is a basket type core lifter, an inner tube extension, and a bit. It should be used only with swivel type core barrel heads. It is the preferred choice for coring clay or badly broken formations.
LOWER END "C"
INTERCHANGEABLE
FOR DRY BLOCKING
Designed to assure longer runs in formations where core lifter resistance causes premature blocking. This assembly does not have any core lifter but has a straight wall inner tube shoe extending down to the bit. This is highly recommended when dry blocking is used.

Interchangeable feature assures quick conversion to meet changing field conditions

LARGE SERIES
Ball Bearing Swivel Type
Double Tube Core Barrels

The large series core barrels are unexcelled for shallow exploration in soft formations, mine drilling, and foundation test boring on embankments, and on slopes and on sites for heavy structures. Let us send you complete details.

The "L" Series of Double Tube Core Barrels has been designed and developed to increase and improve core recovery in ground that is difficult to core with ordinary equipment. These core barrels are especially suitable for use in broken, fissured, porous and easily eroded formations.

This series adds new and desirable features in a design which allows for quick conversion to meet changing field conditions, and which have many proven advantages to the operator. Let Longyear engineers help you select the proper equipment for your needs.

Write today for bulletin containing full details and specifications.

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SHAFT SINKING • GEOLOGICAL INVESTIGATIONS
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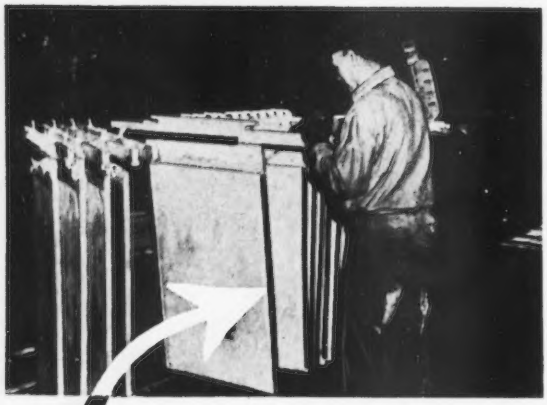

FASTER STRIPPING for ZINC REFINING

Refiners had difficulties in removing zinc deposits from the large aluminum cathodes used in electrolytic zinc refining. Grooved wooden sticks were being used on the vertical edges of the cathode to facilitate separation of the zinc from the aluminum plate. But wood was a poor material, breaking easily and warping from acidic reaction. Aeroflex stripping shapes extruded by Anchor, do not rot, resist acids, absorb no water, are flexible and will not break. Stripping shapes are extruded to your specifications—write us today.

This is but one of the many applications for Anchor extruded plastics. If you have any product where extrusions of any shape or specifications can be used,

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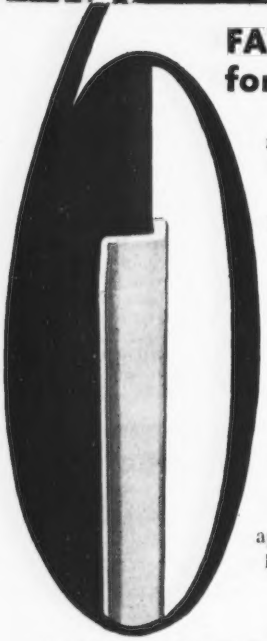

Close-up of flange "U" shaped Aeroflex stripping shape. Springiness of Aeroflex makes for a snap-tight fit on cathode. Aeroflex provides long life and serviceability.

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COMPANY INC.
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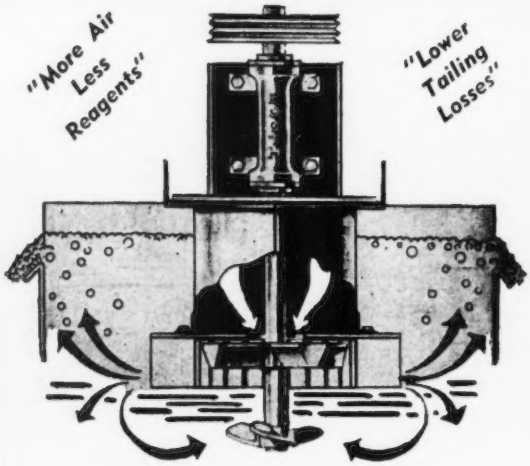

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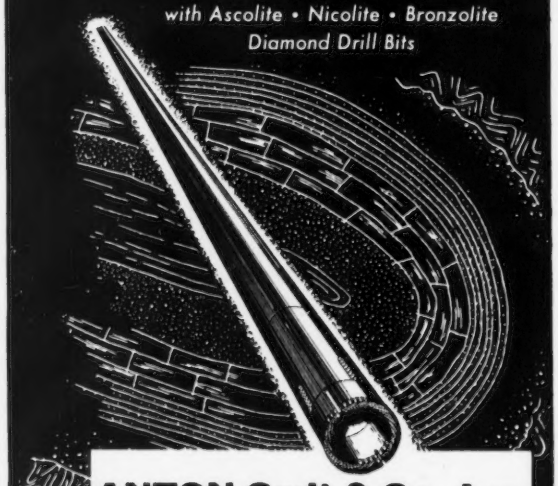

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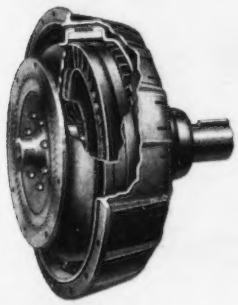
How Hydraulic Coupling Works in a Power Shovel

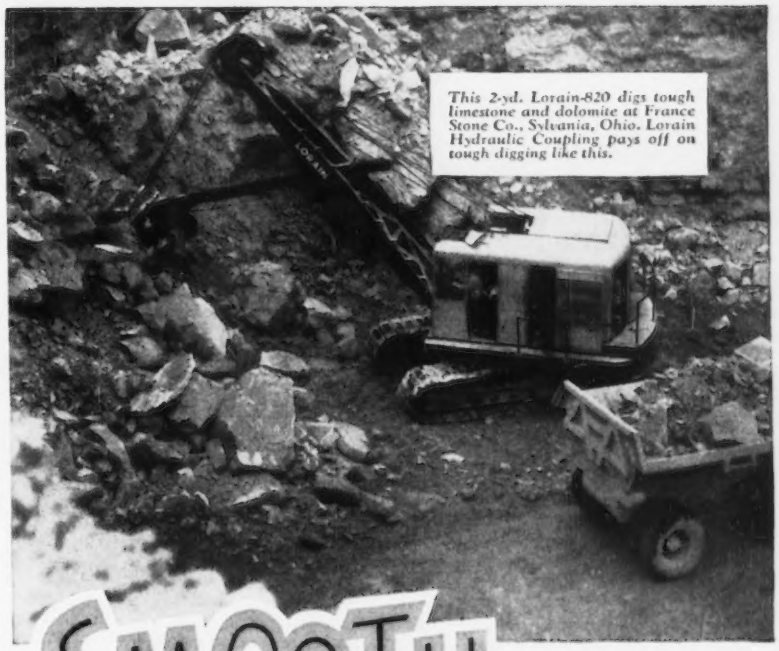
The hydraulic coupling type of power take-off has been proven over the years to add greatly to shovel crane performance and life. It absorbs the impacts and shocks of hard digging, thereby reducing strain and wear on cables, machinery and engine, and it prevents the engine from stalling under any digging or lifting conditions—which is a time-saving, machine-saving feature. These many advantages are readily acknowledged by most shovel-crane men, but even some of those who like what a hydraulic coupling does for them, find it difficult to understand just how it works.

It is a load limit clutch that efficiently transmits full engine power under normal



conditions but "slips" when a shovel dipper, for example, is "hung up" on an immovable rock. This allows the engine to continue to develop full torque, with no abnormal strain on it, the machinery or cables. There is no shuddering to a standstill with stalled engine and the immeasurable strain this puts on the whole machine, as encountered with a friction type of take-off.

Even with a mechanical band type of slip clutch, which is meant to provide shock relief, a maximum point of shock must be reached first before it becomes operative and is released. On the other hand, the hydraulic coupling has an infinite number of points of release, so to speak, which come into operation **before** the point of shock or overload is reached and not **after.** There is no surface friction, no mechanical wear, no overheating of parts. While it is mounted directly on the engine drive shaft, its "cushioning" effect would be as great no matter where it was located in the power train. It absorbs shock in both directions from itself thus giving protection from the dipper teeth to the engine. However, placed where it is, it acts on all phases of operation—hoist, swing, travel, crowd and retract.



This 2-yd. Lorain-820 digs tough limestone and dolomite at France Stone Co., Sylvania, Ohio. Lorain Hydraulic Coupling pays off on tough digging like this.

SMOOTH is the word when it's a **LORAIN-820** in rock!

Your eyes and ears can tell you what a beating your shovel takes in rock. It's a tough life — full of sudden shocks and impacts — that only the best design can withstand.

You will see a big difference in Lorain-820 shovel performance . . . the difference made by the use of Lorain's Hydraulic Coupling. This efficient fluid drive *smooths* out the shocks and impacts, *cushions* them before they have a chance to wrack and strain turntable mechanism and cables. Lorain's steady power keeps "hanging on" until the most unyielding rock is in the dipper — the toughest digging cannot stall the engine. Available air controls and air assist of crowd and travel operations make the operator's job smooth and easy. The net result — more rock in the trucks at the end of the day!

See a Lorain-820 in action. Ask your Thew-Lorain Distributor to show you the "smoothest" rock shovel you can buy.

THE THEW SHOVEL CO., Lorain, Ohio

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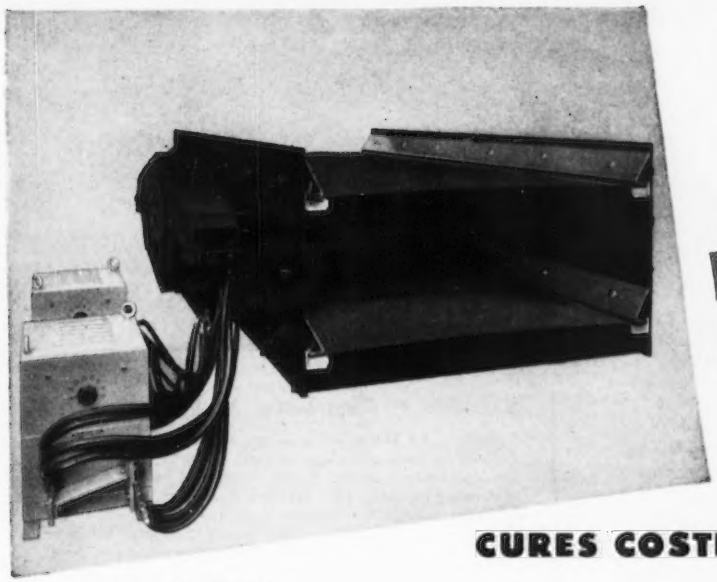
Engineering & Mining Journal, the meeting place of mining men in all parts of the country, points the way to the solution of many mining problems through its Professional Service Section.

Why not tell one of these specialists about YOUR problem?



HEATING NOT BEATING

CURES COSTLY SCREEN BLINDNESS

photo courtesy of Hewitt-Robins, Inc.

The practice of beating blinded screens, a temporary cure at best, runs up labor cost and causes excessive screen failure. Hanco Screen Heaters forever eliminate costly, inefficient sizing resulting from blinded screens.

SCREEN HEATING REDUCES SIZING COSTS

1. Labor cost is cut by elimination of cleaning labor!
2. Screen life is greatly extended for it is no longer damaged by manual cleaning!
3. Sizing is more accurate and faster for processing equipment can be operated at full capacity!

(Every Hanco installation has paid for itself in less than a year!)

EASY INSTALLATION ON ALL SCREEN MAKES

Hanco electric screen heaters are furnished as a complete kit—heater unit, lead cables, copper distribution and feed bars and skirt boards. All necessary small parts and complete instructions are included. Hanco units are designed to match original fittings. Speedy installation can be made by competent maintenance personnel.

HANCO QUICK-CHANGE ASSEMBLY

Available in five styles, Hanco quick-change assemblies assure easy cloth changes. Special skirt boards or tension rails incorporate a wedge type copper distribution bar that is bolted to but insulated from the rail itself. One of the five assemblies shown below is sure to fit your make of screen. Cloth changes are as easy or easier than on an unheated screen.

A-8074

HANCO SCREEN HEATER ADVANTAGES

1. Hanco heaters have a wide application for they heat brass, plain, stainless and monel steel screens.
2. Unique tap changing device allows screen temperature adjustment under load. This means added economy, for you can quickly adjust to seasonal or load demands.
3. Heater terminals are readily accessible for inspection or adjustment.
4. Compact heater units can be floor, wall or ceiling mounted.
5. There is always positive direct contact with the hook strip of the screen cloth.
6. All electrical contacts are shielded from abrasion.
7. Cloth changes are as quick and easy as they are on unheated screens.

HANCO HEATERS ARE AVAILABLE ON MOST NEW SCREEN EQUIPMENT

Send today for descriptive bulletin

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the pioneer electric screen heater

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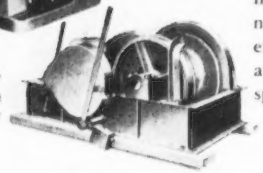
Model SC Superior Capstan Carpuller



Model EP Drum Type Carpuller

One man can move hundreds of tons of rolling load with practically no effort. Economical, efficient, Carpullers are available for your specialized requirements.

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Strong • Fire-Safe • Low Upkeep

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Denver Equipment Company, 1400 Seventeenth Street, Denver, Colorado

Eimco Corporation, 34 South 4th West Street, Salt Lake City, Utah

Distributors—Foreign

Avenida Ejercito Nacional 458-D Colonia Chapultepec Morales Mexico, D.F.

SEARCHLIGHT SECTION

(Continued on pages 231-235)

GENERAL MANAGER

Recognized, successful company with established distribution of essential soil ingredient is seeking a General Manager. Company is planning to expand its manufacturing operations in Northwest and therefore it would be appropriate if General Manager had engineering training, preferably chemical engineering, and it would be helpful if he knew mining or process manufacturing and how to establish a new enterprise. He should have General Manager capabilities, possess initiative and business sense, be able to develop team of workers, and handle all relationships well.

This important permanent position has developed because of expansion and requires an able administrator.

Age 38-50. Salary appropriate.

Replies respected and held in confidence.

P-9572 Engineering & Mining Journal
520 No. Michigan Ave. Chicago 11, Illinois

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SAN FRANCISCO: 68 Post St. (4)

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EXPERIENCED ORE TRADER. Old established house interested to employ experienced Ore trader dealing principally import-export and world trading all minerals. Reply giving full details, experience, background, & photograph if available. P-9136, Engineering & Mining Journal.

WANTED—ASSISTANT Smelter Superintendent in South Africa, technical graduate with several years experience in responsible employment in copper and smelter. P-8460, Engineering & Mining Journal.

WANTED: Mill Superintendent For large lead-zinc-copper flotation plant, location Mexico. This is an opportunity for a competent man to become connected with a large progressive organization with its many advantages. Excellent location. P-9282, Engineering & Mining Journal.

WE ARE looking for an engineer familiar with mines—write giving references, areas familiar with, to Agence Havas No. 5246 Lyon, France.

WANTED: EXPERIENCED designer, with proven record in development of air actuated percussive tools as used in mining and construction industries. Also junior engineers with design aptitude to enter the engineering departments. Location—New York State. Apply, listing experience in full to P-9359, Engineering & Mining Journal.

SELLING OPPORTUNITIES OFFERED

SALESMAN WANTED: Preferably one with some engineering training and quarry experience to sell explosive items to quarries, mines, contractors, etc. Attractive proposition. Apply to Explosive, Box 900, Martinsburg, W. Va.

(Continued on the opposite page)

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Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y. 36, N. Y. For December Issue closing November 20th.

Well Drilling Tool Expert

Foreign assignment with international research and engineering organization. Thoroughly experienced in the processes of manufacturing drilling and fishing tools for use with water well drilling rigs.

Will advise and instruct local workers in improvement of manufacturing processes and maintenance methods for tools.

One year abroad. Attractive salary, overseas differential, cost-of-living allowance. Transportation furnished for family.

P9446 Engineering News Record
520 N. Michigan Ave., Chicago 11, Ill.

SELLING OPPORTUNITIES OFFERED

(Continued from opposite page)

MACHINERY SALESMAN: Excellent opportunity for experienced man with background in selling and mining. Must have knowledge of mining and ore dressing, know equipment and have ability to sell. Traveling when necessary. Work out of home office of prominent western machinery manufacturer. Please write stating all details as to education, experience, availability and other pertinent information. SW-9675, Engineering & Mining Journal.

POSITIONS WANTED

SUPERINTENDENT: EM. 56 Practical. Efficient. Progressive. Experienced handling native labour. Mining and Milling. Latin America preferred. PW-9138, Engineering & Mining Journal.

MILL SUPERINTENDENT or Assistant. 54. Modern methods. Cyanide, Flotation. Testing, Lay out, construction. Latin America or Orient. PW-9139, Engineering & Mining Journal.

MINING ENGINEER, BS, 38, two years underground experience, thirteen years a naval officer with 6000 hours pilot time in air transport desires position utilizing administrative experience, engineering background, or as company pilot or both. PW-9427, Engineering & Mining Journal.

GEOLOGIST: B. Sc. Geol. Eng. and Mng. Eng. 35, family. Two years as geologist in zinc and lead mine. One and one half years as shift boss, cut and fill stoping in heavy ground. References and data on request. Available December 1st. South West and West preferred. PW-9611, Engineering & Mining Journal.

MINING ENGINEER, 35, with experience in underground copper, open pit and underground iron ore, Tri-state zinc mining plus some mine examination and evaluation. Also four years structural design experience in steel and concrete. Desires position of considerable responsibility. PW-9610, Engineering & Mining Journal.

BUSINESS OPPORTUNITY

Copper Claim for sale. Ideal for open pit mining. Contact J. F. Hopper, RT. 3, Box 138 B, Yuma, Arizona.

MANAGER

Competent manager available, graduate engineer, 36 years experience, capable of handling large properties, experienced in handling labor matters and discussions, exploration and operational work, fluent Spanish.

PW-9510 Engineering and Mining Journal
68 Post Street San Francisco, Calif.

WANTED

For MINERAL RESOURCES DEVELOPMENT CORPORATION, An Agency of the government of the Union of Burma, for positions of Departmental Head.

1. MINING ENGINEER:
Qualifications: University Degree in Metalliferous Mining or Similar Qualification. Several Years Practical Experience of Exploration, Development and Operation in Metalliferous Mining, both Underground and Open Pits, Some experience of Heavy Construction. Should have had Administrative Experience.
Duties: Examination and Valuation of Mineral Prospects. Exploration of Mineral Deposits by Drilling, Doring, etc. Preparation of Mine and Plant Designs. Supervision of Construction Work.

2. MINING ENGINEER (COAL):
Qualifications: University Degree in Mining or Equivalent Qualification. Several Years' Experience of Exploration, Development and Operation in Coal Mining. Adequate to Experience of Coal Washerios and Carbonization, Briquetting, Calcining and Coking Plants. Should have had Administrative Experience.
Duties: Examination and Valuation of Coal Coal Prospects. Exploration of Coal Deposits by Drilling, etc. Preparation of Mine and Plant Designs for a Coal Mine under consideration. Supervision of Construction Work on Mine and Plant.

3. NON-FERROUS METALLURGIST:
Qualifications: University Degree in Metallurgy or Equivalent Qualification. Adequate Experience of Methods of Ore Dressing, Smelting and Refining. Extensive Plant Design Experience. Should be familiar with the use of Electrolytic and Electrothermic Processes in the reduction of Zinc and with Oxidation and reduction of Antimony.
Duties: Advice on Methods of Beneficiation of Low Grade Ores and on setting up of Smelting and Refining Industries in Zinc, Tin, Antimony and Cobalt, and Extraction of Sulphuric Acid from Smelting and Industrial Gases. Setting up of Pilot Plants. Supervision of any Construction Work on Smelting and Refining Plants.

4. ECONOMIC GEOLOGIST:
Qualifications: University Degree. Familiarity with Modern Methods of Geophysical Exploration. Adequate Experience of Calculation of Ore Reserves.
Duties: Reconnaisance Surveys, Exploration and Geological Mapping. Economic Appraisal of Mineral Resources.

APPLY TO The Director-General, Mineral Resources Development Corporation, Secretariat, Rangoon, Burma, with references giving full particulars of age, education, qualifications and experience (in chronological order), stating salary and terms required.

WANTED
Assistant Manager

For large foreign copper property operating long time in healthy, temperate, low altitude area. American citizen, diplomatic, tactful, 42-48 years old. Must be thoroughly competent mining engineer with good underground experience. Some open-cut experience might be desirable. Salary open. Three year contract. Submit complete record, references. Photograph optional.

P-9515 Eng. & Mining Journal
1111 Wilshire Blvd., Los Angeles 17, Calif.

Metallurgical Engineer

Applications are invited from graduate Metallurgical Engineers, preferably in the age range 40 to 45, who have had not less than ten years broad and responsible experience in the field of nonferrous extraction metallurgy, for the position of Assistant Metallurgist to the undermentioned Corporation. The position entails duties in connection with the important group of Northern Rhodesian mining companies producing copper, cobalt, lead, zinc and other base metals, to which the Corporation acts as Consulting Engineers.

The salary to be offered will be commensurate with the successful candidate's qualifications and esperience. Membership of the Corporation's Pension Fund will be a condition of employment.

Applicants must be prepared to take up residence in Kitwe, Northern Rhodesia. The cost of transportation of the successful candidate, his wife and children up to 18 years of age and reasonable personal effects will be borne by the Corporation. A modern three-bedroomed brick house, with essential furniture, will be made available at a rental which will not exceed $28.00 per month.

Excellent medical facilities are provided and recreational amenities are outstanding.

Initially the engagement will be for a period of three years, after which service may be extended indefinitely, but will be subject to six months notice of termination by either party. Repatriation privileges on the same scale as above will be granted at the end of three years service. Leave is generous and amounts at present to 60 days per annum which can be accumulated up to a maximum of 180 days.

Applications stating age, marital status, educational and professional qualifications and giving details of past experience and positions held should be addressed to:

Personnel Officer,
Anglo American Corporation of South Africa, Limited,
P.O. Box 4587, JOHANNESBURG.

Additional Position Vacant Advertising on pages 230 and 232

CHEMICAL ENGINEERS
METALLURGICAL ENGINEERS

Freeport Sulphur Company is engaged in a new and challenging hydrometallurgical research project for the recovery of nickel and cobalt.

We are looking for several chemical and metallurgical engineers with 1 to 5 years' experience to fill out the research, process development and pilot plant staff at Freeport, Texas.

Please send a detailed resume. Replies will of course be held confidential.

Mr. M. B. Sheldon

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WANTED INDUSTRIAL PLANTS

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Underground Sinking Hoist

150-200 HP 2-drum, sectionalized, to go down 5' x 5' vertical shaft. Give us description of any hoist you have for sale.

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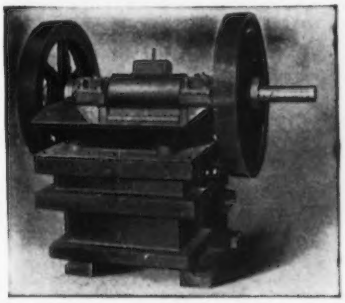

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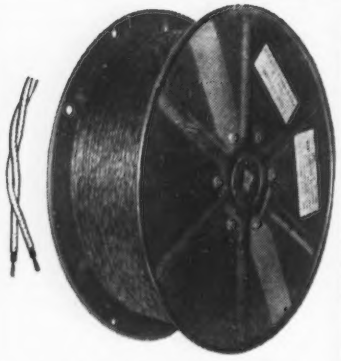

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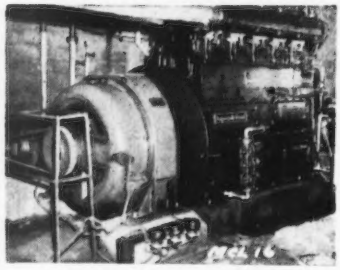

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20"	4	1/8"	1/32"	28 Oz.
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24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

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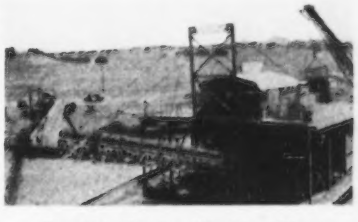

Dragline Dredge Washing Plant
42" Conveyor Belt
Capacity 400 cu. yds. per hour

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without overhaul

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Ore averages 46-55%. Dirt must be removed regularly from the basins after settling. That means summer and winter operation for these sturdy yellow machines. Quick-starting, they need no pampering even on coldest winter days. They have stamina to work in frozen materials, and balance and traction to keep going when it's sticky underfoot. They're built to work the year around—or as far into the winter as *you* want them to work, and then get you off to an early start again in the spring.

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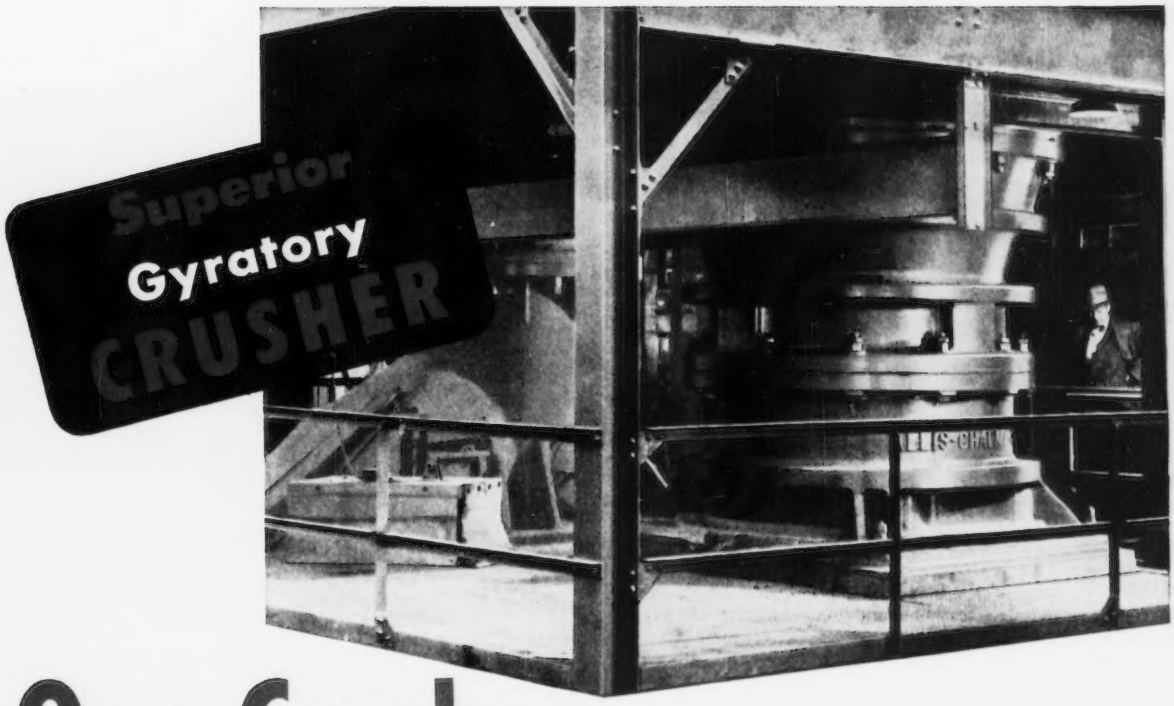

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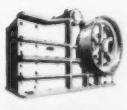
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Gyratory Crushers

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Kilns, Coolers, Dryers

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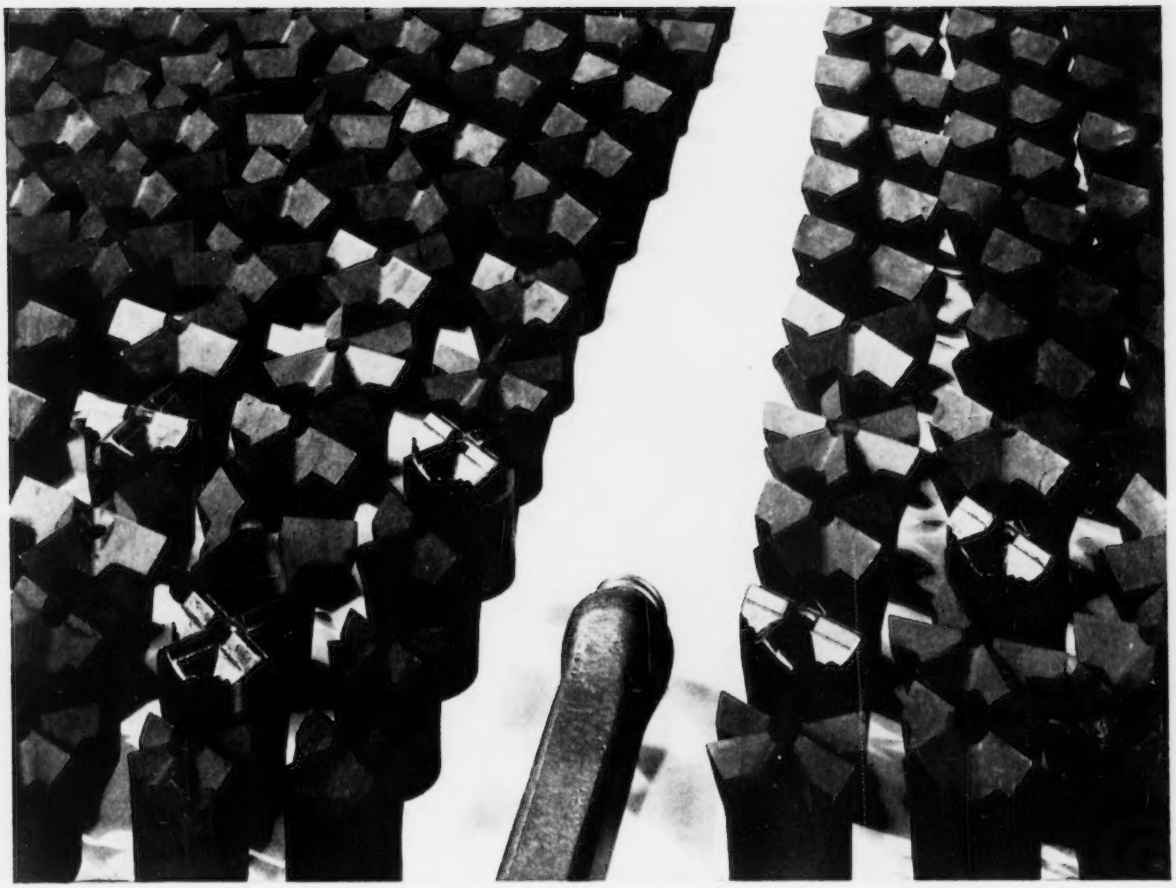

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